



**Final**

# **Explanation of Significant Differences to the Final Record of Decision for Parcel C**

**Hunters Point Shipyard  
San Francisco, California**

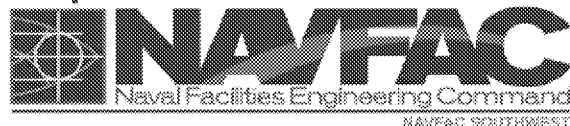
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**Prepared for:**



**Prepared by:**





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Prepared for:



**Department of the Navy  
Naval Facilities Engineering Command  
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# Acronyms and Abbreviations

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µg/L	microgram per liter
BCT	Base Realignment and Closure Cleanup Team
bgs	below ground surface
CAA	corrective action area
CCSF	City and County of San Francisco
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
DTSC	California Department of Toxic Substances Control
EPC	exposure point concentration
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
FS	Feasibility Study
ft bgs	feet below ground surface
HHRA	human health risk assessment
HI	hazard index
HPAL	Hunters Point ambient level
HPNS	Hunters Point Naval Shipyard
IC	institutional control
IRP	Installation Restoration Program
KCH	CH2M HILL Kleinfelder, A Joint Venture
mg/kg	milligram per kilogram
Navy	United States Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NIRIS	Naval Installation Restoration Information Solution
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl

RA	remedial action
RAGS	<i>Risk Assessment Guidance for Superfund</i>
RAO	remedial action objective
RBC	risk-based concentration
RD	remedial design
RG	remedial goal
RI	remedial investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RU	remedial unit
RWQCB	California Regional Water Quality Control Board, San Francisco Bay Region
SS/SD	sanitary sewer/storm drain
SVE	soil vapor extraction
SVOC	semivolatile organic compound
TCRA	time-critical removal action
TPH	total petroleum hydrocarbons
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
yd <sup>3</sup>	cubic yards
ZVI	zero-valent iron

# 1.0 Introduction

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## 1.1 Statement of Purpose

The Final Record of Decision for Parcel C (Final ROD) at the former Hunters Point Naval Shipyard (HPNS) was signed on September 30, 2010. This Explanation of Significant Differences (ESD) to the Final ROD documents changes to the remedial action (RA) soil excavation boundaries. Changes to the soil excavation boundaries presented in the Final ROD (Navy, 2010) were proposed in Appendix G of the *Final Work Plan, Parcel C Remedial Action, Remedial Units C1, C2, C4, and C5, and Building 241(Excludes C2)* (Technical Memorandum) (Shaw, 2013).

These changes are a result of applying tiered action levels for soil excavation where high concentrations of select contaminants of concern (COCs) will be removed based on risk identified in a screening-level human health risk assessment (HHRA) rather than excavating to remedial goals (RGs) in all excavation locations. The tiered action levels (Tier 1 and Tier 2) are based on the RGs identified in the Administrative Record that were presented in the Final ROD executed by the United States Department of the Navy (Navy) and the Federal Facility Agreement (FFA) signatories (Navy, 2010). Tier 1 action level is defined as locations where select COCs are present at ten times the RG. Tier 2 action level is defined as locations where select COCs are present at five times the RG. Implementation of these tiered action levels for the excavation portion of the selected soil remedy will result in a change to the RGs as presented in the Final ROD, scope reduction and cost reduction, but no change to the remedial action objectives (RAOs) and no fundamental change to the overall cleanup approach of excavation and protective cover.

The Final ROD was issued pursuant to the Navy's authority as the lead federal agency for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for remedy selection at sites at former HPNS pursuant to Sections 104 and 120 of CERCLA, Executive Order 12580, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). The lead regulatory agency for overseeing site cleanup at HPNS is the United States Environmental Protection Agency (USEPA). In addition to the USEPA, state agencies including the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) and the California Department of Toxic Substances Control (DTSC) oversee the site cleanup at former HPNS pursuant to the FFA.

This ESD will become part of the Administrative Record File for Parcel C and will be available for public review at the following locations:

San Francisco Main Library  
100 Larkin Street  
Government Information Center, 5th Floor  
San Francisco, CA 94102  
Phone: (415) 557-4500

Information Repository  
Hunters Point Shipyard Site Trailer  
690 Hudson Avenue  
San Francisco, CA 94124

The complete Administrative Record is located at 1220 Pacific Highway, San Diego, California, and is maintained by Ms. Diana Silva, Naval Facilities Engineering Command (NAVFAC), Southwest Administration Record Manager, phone: (619) 532-3676.

The preparation of this ESD is pursuant to Section 117(c) of CERCLA, as amended by the Superfund Amendment and Reauthorization Act of 1986, and pursuant to 40 Code of Federal Regulations (CFR) Section 300.435(c)(2)(i). This ESD was prepared in accordance with the USEPA guidance document, *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (USEPA, 1999).

## 1.2 Project Objective

The objective of this ESD is to document changes to excavation boundaries based on a screening-level HHRA associated with exposure concentrations of COCs above the RGs in excavation areas identified in the Final ROD. The changes in excavation boundaries focus on removing higher concentrations of select COCs that pose a more substantial risk to human health. Tier 1 (ten times the RG) and Tier 2 (five times the RG) action levels were used to identify areas where higher concentrations of select COCs would be excavated. The application of tiered action levels for the excavation boundaries will result in changes to the specific numerical RGs identified in the ROD. However, the RAOs and the installation of a cover remedy identified in the Final ROD will not change. The cover remedy addresses unacceptable risk posed by residual contamination. This change in excavation boundaries, along with placement of the cover and implementation of institutional controls (ICs), still meets the soil remedial action objectives (RAOs) as specified in the Final ROD.

1. Prevent or minimize exposure to organic and inorganic chemicals in soil at concentrations above remediation goals developed in the HHRA for the following exposure pathways:
  - a. Ingestion of, outdoor inhalation of, and dermal exposure to, surface and subsurface soil.
  - b. Ingestion of homegrown produce in native soil.
2. Prevent or minimize exposure to volatile organic compounds (VOCs) in soil gas at concentrations that would pose unacceptable risk via indoor inhalation of vapors.

## 1.3 ESD Organization

This ESD is organized into the following sections:

- Section 1 – Introduction
- Section 2 – Summary of Site History, Contamination, and Selected Remedy
- Section 3 – Basis for Significant Changes in the Selected Remedy
- Section 4 – Description of Significant Differences

- Section 5 – Support Agency Comments
- Section 6 – Statutory and Regulatory Determinations
- Section 7 – Public Participation
- Section 8 - References

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## 2.0 Summary of Site History, Contamination, and Selected Remedy

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This section presents a summarized description and history of HPNS Parcel C, as presented in the RA Work Plan (Shaw, 2013). Four remedial units (RUs) in Parcel C (RU-C1, RU-C2, RU-C4, and RU-C5) were defined based on sources of contamination in groundwater. The Final ROD (Navy, 2010) identified 31 excavation areas associated with these RUs and Building 241. This ESD presents changes to some excavation boundaries resulting from a tiered approach where soils exceeding the RGs are left in place for metals (excluding mercury) and polychlorinated biphenyls based on the results of a screening level HHRA which shows these locations are within the acceptable risk range and/or are statistically similar to background. The screening level HHRA was originally performed on eight of the 31 excavations but only four excavations met the criteria for reduction.

### 2.1 Site Description and History

The main portion of HPNS is situated on a long headland located in the southeastern part of San Francisco extending eastward into the Bay (Figure 2-1). The headland is bounded on the north and east by the Bay and on the south and west by the Bayview/Hunters Point district of San Francisco. Parcel C consists of about 73 acres of shoreline and lowland coast along the east-central portion of HPNS (Figure 2-2). Parcel C, located south of Parcel B and east of Parcel D-1 and Parcel G, is bounded on the east by the Bay, on the south by Berths 8 and 9, on the southwest by Dry Dock 4, and on the west by Fisher Avenue. Parcel C is the oldest portion of the shipyard and has been used almost exclusively for industrial purposes since the late 1800s. Historically, the dominant land use of Parcel C has been for shipping, ship repair, and office and commercial activities. According to the redevelopment plan (SFRA, 2010), Parcel C is expected to be zoned to accommodate buildings for cultural and institutional uses; research and development; and mixed-use areas for live/work spaces for artists that will include studios, galleries, warehouses, and hotels. The area along the eastern portion of Parcel C bounded by the Bay will be set aside as open space.

### 2.2 Summary of Site Risks for Soil at Parcel C

This section provides a summary of site risks associated with soil at Parcel C as presented in the Final ROD. Risk associated with groundwater and radionuclides in structures at Parcel C is not the subject of this ESD and is not discussed in the following summary. During the remedial investigation (RI), the Navy concluded that limited viable habitat is available for terrestrial wildlife at Parcel C because most of the site is covered with pavement. Therefore, ecological risk associated with exposure to soil was not evaluated further.

#### 2.2.1 Site Risks for Soil

The source of contamination in soil at Parcel C is attributed to industrial operations and radiological research activities by the Navy and other tenants. The contamination is from

identified Installation Restoration Program (IRP) sites with associated spills and leaks. Naturally occurring and ubiquitous metals, such as arsenic and manganese, are also found at levels consistent with ambient concentrations in the local serpentine bedrock. The primary fate and transport mechanisms include volatilization, wind suspension, migration of contaminants via infiltration and percolation into subsurface soil, and root uptake.

Both total and incremental human health risks were evaluated for exposure to soil. All detected chemicals, including naturally occurring ubiquitous metals from the serpentine bedrock-derived fill material, were included as chemicals of potential concern for the total risk evaluation, regardless of their concentration. The total risk evaluation estimates the risks posed by chemicals at the site, including those present at concentrations at or below ambient levels. The essential nutrients calcium, magnesium, potassium and sodium were excluded as chemicals of potential concern in soil for the incremental risk evaluation, as well as the detected ubiquitous metals with maximum measured concentrations below the Hunters Point ambient levels (HPALs). The incremental risk evaluation estimates risks posed by metals present at the site that are above the estimated ambient levels.

Based on the revised HHRA results for soil, chemical cancer risks within Parcel C are greater than  $10^{-6}$  at all redevelopment blocks except COS-1, which was evaluated for recreational risk. Noncancer hazard indexes (HIs) were less than 1 for redevelopment blocks CMI-1, evaluated for industrial risk, and COS-1, COS-2, and COS-3, evaluated for recreational risk. Eight of these redevelopment blocks (10, 11, 13, 18, 20A, 23, 24, and 26) with the higher chemical cancer risks and noncancer HIs were evaluated against the more stringent residential exposure scenario. Redevelopment blocks are shown on Figure 2-2. Potential cancer risks from soil are based on inhalation of chlorinated VOCs and other VOCs, and on ingestion or contact with arsenic, lead, polycyclic aromatic hydrocarbons (PAHs) and other semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs). Potential noncancer hazards from soil are based on ingestion of or contact with organic lead and manganese. The risk from indoor air inhalation via vapor intrusion from soil was not evaluated in the HHRA; however, action levels for soil gas that are protective of indoor air exposure from vapor intrusion of soil and groundwater were established during the remedial design (RD) to address exposure to volatile chemicals in the subsurface at concentrations that would pose unacceptable risk (ChaduxTt, 2010).

Additionally, radiological risk was calculated based on estimated concentrations of contamination at radiologically affected sites, using remediation goals for each radionuclide of concern. Actual calculated risk will be based on field measurements after final status survey results have been received for each affected site.

## **2.3 Previous Studies and Removal Actions**

The Navy has completed a number of treatability studies and removal actions at Parcel C. These actions have reduced or eliminated certain risks to human health and ecological receptors. Based on these removal actions and treatability studies, the sources and extent of remaining contamination in soil and groundwater has been well-characterized (Table 2-1).

Storm drains and sanitary sewer lines were removed in 2007 in portions of former Redevelopment Blocks 10 and 11 in Parcel C to address radiological concerns. Removal of storm drain and sanitary sewer lines within the remainder of Parcel C started in 2010.

Phase I of this work was reported in the *Draft Radiological Removal Action Completion Report Parcel C, HPNS, San Francisco, California* (Tetra Tech EC, Inc., 2012) and Phase II will be reported in a future document. Final excavation boundaries from Phase I storm drains and sanitary sewer line removals and Phase II planned removals are included in the excavation figures of this ESD (Figures 4-2 through 4-12 in Section 4).

## 2.4 Summary of Selected Remedy

The CERCLA remedy selected in the Final ROD (Navy, 2010) is necessary to protect human health and the environment from actual or potential releases of hazardous substances, pollutants, and contaminants from the site. The remedy consists of excavation and offsite disposal, soil vapor extraction (SVE), durable covers, and ICs to address soil contamination (Alternative S-5); treatment of VOCs with zero-valent iron (ZVI) or a biological substrate, monitored natural attenuation, and ICs to address groundwater contamination (Alternative GW-3B); and decontamination of buildings, removal of storm drains and sewer lines, and excavation to address radiologically affected soil (Alternative R-2). The remedy for Parcel C addresses metals, PAHs, other SVOCs, VOCs, PCBs, and pesticides in soil; and radionuclides in structures (such as buildings) and in soil. The remedy also addresses VOCs, PAHs, and SVOCs found in groundwater in both the A- and B-aquifers, and metals and pesticides found in the B-aquifer.

The remedy is protective of human health and the environment, complies with federal and state statutes and regulations that are applicable or relevant and appropriate to the remedy, and is cost-effective. The selected remedy (1) uses permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and (2) satisfies the statutory preference for remedies employing treatment that reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element. A statutory review will be conducted within 5 years after the Final ROD was signed to ensure that the remedy is, or will be, protective of human health and the environment.

This ESD applies only to the soil excavation component of the remedy (Alternative-S-5) and therefore other remedy components (Alternatives GW-3B and R-2) are not discussed further in this document.

### 2.4.1 Summary of Selected Soil Alternative S-5

Soil Alternative S-5 was selected to meet the following soil RAOs:

Prevent or minimize exposure to organic and inorganic chemicals in soil at concentrations above remediation goals developed in the HHRA for the following exposure pathways:

- a. Ingestion of, outdoor inhalation of, and dermal exposure to, surface and subsurface soil.
- b. Ingestion of homegrown produce in native soil.

Prevent or minimize exposure to VOCs in soil gas at concentrations that would pose unacceptable risk via indoor inhalation of vapors.

The remedy selected in the Final ROD consists of excavation, disposal, covers, SVE, and ICs. Excavation would consist of removing soil in selected areas where COCs exceed remediation goals, and disposing of excavated soil at an offsite facility. Excavations were planned at 31 areas within Parcel C, with a total removal of approximately 42,000 cubic yards (yd<sup>3</sup>) of soil, and were to be conducted to a maximum depth of 10 feet below ground surface (bgs). Post-excavation sampling and analysis would be used to verify that remedial goals were achieved. Clean soil would be placed and compacted to backfill excavated areas.

SVE would be implemented as a source reduction measure to address VOC-contaminated soil. The SVE areas border soil sampling locations where VOCs were detected at concentrations above remediation goals and where soil characteristics are appropriate for SVE.

Across Parcel C, durable covers will be applied as physical barriers to break the exposure pathway to ubiquitous metals in soil. Existing asphalt and concrete surfaces (repaired as necessary to be durable) and buildings will also act as covers. The type of new covers installed will be consistent with the redevelopment plan (for example, soil covers may be used for open space areas, or asphalt for industrial areas).

This ESD presents changes to some excavation boundaries resulting from a tiered approach where soils exceeding the RGs are left in place for metals (excluding mercury) and polychlorinated biphenyls based on the results of a screening level HHRA which shows these locations are within the acceptable risk range and/or are statistically similar to background. The screening level HHRA was originally performed on eight of the 31 excavations but only four excavations met the criteria for reduction.”

## 3.0 Basis for Significant Changes in the Selected Remedy

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This section presents information that supports a change to the soil remedy (S-5) selected in the Final ROD (Navy, 2010). The RGs in the Final ROD (Navy, 2010) were originally applied to soil areas within Parcel C to develop the excavation boundaries. Changes to the soil excavation boundaries presented in the Final ROD (Navy, 2010) were proposed in Appendix G of the *Final Work Plan, Parcel C Remedial Action, Remedial Units C1, C2, C4, and C5, and Building 241(Excludes C2)* (Technical Memorandum) (Shaw, 2013). This information in the Administrative Record supports the need for a change to the Final ROD. On December 4, 2012, the Navy and regulatory agencies held a meeting in Oakland, California to discuss re-evaluation of the soil excavations for RU-C1, RU-C2, RU-C4, and RU-C5, and Building 241.

An evaluation of ambient manganese conditions at HPNS was conducted to identify its level and extent in soil (TtEMI, 2001b). Additionally, a revised screening-level HHRA was performed to determine if leaving soil with concentrations exceeding the RGs for ubiquitous metals and organic chemicals in place would still be protective of human health. Based on the screening-level HHRA results, the tiered approach was applied to specific excavations where higher concentrations of select metals and organic chemicals existed (at 5x and 10x the RGs), and it was concluded that the recommended modifications to the remediation strategy would still be within the acceptable risk range and below a hazard index of 1. The tiered approach remains protective of human health by reducing risk to within the risk range (defined as 1E-4 to 1E-6 as discussed in the NCP [USEPA, 1994]) and/or reducing the hazard to below 1. Further, the implementation of the tiered approach does not change the soil RAOs as the revised approach still prevents or minimizes exposure to chemicals at concentrations above the revised RGs at these locations.

This tiered approach applies only to metals (excluding mercury) and PCBs. All other COCs (mercury, total petroleum hydrocarbons [TPH], VOCs, PAHs, and pesticides) will be remediated to the RGs set forth in the Final ROD. Table 4-1 lists each excavation area, its associated tier, COCs, and action levels.

Incorporation of tiered action levels for select excavations is the subject of this ESD. This excavation strategy was implemented using the USEPA Triad methodology (2001) in coordination with the Base Realignment and Closure Cleanup Team (BCT). The BCT includes representatives from USEPA, DTSC, RWQCB, City and County of San Francisco (CCSF), and the Navy.

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## 4.0 Description of Significant Differences

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In accordance with NCP Section 300.435(c)(2), and USEPA guidance on preparing proposed plans, RODs, and other remedy selection decision documents (USEPA, 1999), post-ROD changes may be categorized as non-significant (or minor) changes, significant changes, or fundamental changes based on the nature of change with respect to scope, performance, and/or cost. Non-significant changes are minor changes that usually arise during design and construction, when modifications are made to the functional specifications of the remedy to optimize performance and minimize cost. This may result in minor changes to the remedy implementation, which could be documented in a Memorandum to the Administrative Record File. If the change involves components of the remedy and does not fundamentally alter the selected remedy, it is regarded as a significant change. If the change in remedy fundamentally alters the ROD in such a manner that the proposed action, with respect to scope, performance, or cost, is no longer reflective of the remedy selected in the ROD, the lead agency is required to issue a notice of availability and brief description of the proposed amendment to the ROD.

Changes to the remedies documented in this ESD are considered significant because they involve components of the remedy but do not fundamentally alter the selected remedy. The changes do not affect evaluation of the selected remedies with respect to NCP evaluation criteria, and they comply with all applicable or relevant and appropriate requirements identified and documented in the Final ROD. There is no fundamental change in the performance of the remedy but there are changes to excavation areas and volumes (i.e., scope) and cost of the selected remedy.

The following excavation areas have significant changes where boundaries were removed or modified based on the tiered approach to excavation.

Removed:

- RU-C1 – Soil Excavation 22-2
- RU-C4 – Soil Excavation 24-3

Modified Excavation Boundaries and Depth

- RU-C4 – Soil Excavations 23-1 and 24-5
- RU-C5 – Soil Excavation 11-2

The following excavation areas have non-significant changes where excavation depth was revised to extend 1 foot vertically from the known extent of contamination rather than 10 feet bgs as described in the Final ROD. RU-C4 – Soil Excavations 24-2, 24-4, and 26-2.

- RU-C5 – Soil Excavations 10-3, 10-4, and 11-1
- Building 241 – Soil Excavations 18-2, and 18-4

No changes are proposed for the following areas. Excavation at these areas will be based on RGs as presented in the Final ROD rather than the tiered approach presented in this ESD.

- RU-C1 - Soil Excavations 22-1, COS-2-1, and COS-2-2
- RU-C2 - Soil Excavations 20A-1, 20B-1, 13-1, and 20B-2
- RU-C4 - Soil Excavations 23-2, 23-3, 24-1, 24-6, 26-1, and CMI-1
- RU-C5 - Soil Excavations 10-1, 10-2, and 10-5
- Building 241 - Soil Excavations 18-1, and 18-3

## 4.1 Excavation Evaluation Approach

The original soil excavation footprints and name/identification (Figure 4-1) were defined in the *Final Feasibility Study for Parcel C, Hunters Point Naval Shipyard, San Francisco, California* (Final FS) (SulTech, 2008), repeated in the Final ROD (Navy, 2010) and Final RD (KCH, 2012). In cooperation with the FFA signatories, the Navy developed a revised tiered approach that reduces excavation of soil that will not pose an unacceptable risk to human health and the environment once the remedy is fully implemented. Excavations were evaluated based on historical excavations, recent excavations, and available sample data. This section addresses the general concept of applying a tiered approach to excavations.

### 4.1.1 Tiered Approach

Removal of ubiquitous metals and organic chemicals in soil at concentrations exceeding RGs could involve excavating very large quantities of soil (i.e., over 40,000 bank cubic yards) from Parcel C. A screening-level HHRA was performed to determine the risks and hazards associated with exposure to concentrations of COCs lower than five times the RGs (with an acceptable risk defined as falling within the risk management range [i.e., 1E-4 to 1E-6] as discussed in the NCP [USEPA, 1994]). Rather than excavate all soils containing ubiquitous metals above RGs and all organics with isolated concentrations above RGs, excavation focused on removing higher concentrations of COCs. Isolated locations were identified through a review of existing sample data to determine if there were high concentration locations generally surrounded by lower or risk-based tiered concentrations. The tiered approach includes:

- Tier 1 locations that contain COCs at concentrations greater than ten times the RGs
- Tier 2 locations that contain COCs at concentrations greater than five times the RGs

It should be noted that Tier 1 locations (ten times the RG) by definition also include Tier 2 locations (five times the RG). The Navy focused the list of COCs to those present at concentrations that exceeded the RGs by a factor of 5 (Tier 2). These generally correspond to an excess cancer risk of 1 in 1,000,000 or a noncancer HI of 1 based on an evaluation of incremental risk. The areas are referred to as Tier 1 and Tier 2 locations.

This tiered approach applies only to metals (excluding mercury) and PCBs. Metals and PCBs were chosen for the tiered approach since these COCs do not migrate in soil and can be successfully contained under a durable cover. An evaluation of ambient manganese conditions at HPNS was conducted to identify its level and extent in soil (TtEMI, 2001b). Metals that are ubiquitously encountered at Hunters Point (e.g., manganese) are often above RGs and are associated with the basement rock underlying the surface fill and the fill itself.



All other COCs (mercury, total petroleum hydrocarbons [TPH], VOCs, PAHs, and pesticides) will be remediated to the RGs set forth in the Final ROD. Table 4-1 lists each excavation area, its associated tier, COCs, and action levels.

### Screening-Level Human Health Risk Assessment

As described in the Technical Memorandum (Shaw, 2013), a new screening-level HHRA was performed to estimate the residual risks and hazards associated with excavation to Tier 1 and Tier 2 action levels for metals (excluding mercury) and PCBs for the following excavation areas:

- Excavation 22-2
- Excavation 23-1
- Excavation 24-3
- Excavation 24-4
- Excavation 24-5
- Excavation 10-3
- Excavation 10-4
- Excavation 11-2

These eight excavation areas were chosen because the contamination identified in the Final FS (SulTech, 2008) was mostly attributed to concentrations of ubiquitous metals exceeding the RGs established in the Final ROD and/or isolated detections of COCs with elevated concentrations of organics. The results of the HHRA showed three of the locations (10-3, 10-4, and 24-4) would not be consistent with a tiered approach. Contamination in these areas will be removed to the RG; however, the excavation footprint will be reduced as detailed in Section 4.2.4.

Residual exposure point concentrations (EPCs) in soil were estimated within the excavation footprint from 0 to 10 feet bgs using USEPA (2013) *ProUCL Software*, based on data input files representative of future exposure conditions following Parcel C remediation. The ProUCL Software, Version 4.1, statistical program was used to estimate 95 percent upper confidence limits (UCLs) on the mean for the chemical data sets. For data sets with a combination of non-detect and detect results, ProUCL Software uses the Kaplan-Meier estimation method to derive a recommended 95 percent UCL (USEPA, 2010). Where ProUCL Software recommended the results of more than one statistical approach, the most conservative (highest) 95 percent UCL value was used. Where fewer than approximately three samples had detected values, or less than or equal to five samples were available, ProUCL Software did not calculate a 95 percent UCL value. In these cases, the maximum detected concentration was conservatively used as the EPC.

To estimate residual cancer risks and noncancer hazards, the estimated EPCs were scaled with numeric residential risk-based concentrations (RBCs) from the Final FS (SulTech, 2008), as follows:

- Estimated risk = 95 percent UCL EPC/RBC  $\times$  1E-6, for RBCs based on cancer health endpoint
- Estimated hazard = 95 percent UCL EPC/RBC  $\times$  1.0, for RBCs based on noncancer health endpoint

Individual COC cancer risks were summed for each Parcel C excavation area, as delineated in the Final FS (SulTech, 2008), to obtain a total estimated residual cancer risk. Individual COC noncancer hazards were also summed for each Parcel C excavation area to obtain a total estimated residual noncancer HI.

Estimated residual risks and hazards were compared with the target risk range of 1E-4 to 1E-6 and target hazard threshold of 1.0, as discussed in the NCP (USEPA, 1994) and *Risk Assessment Guidance for Superfund* (RAGS), Part A (USEPA, 1989). As discussed in USEPA's Office of Solid Waste and Emergency Response directive (USEPA, 1991), if the cumulative carcinogenic risk to a receptor (based on reasonable maximum exposure for both current and future land use) is less than 1E-4 and the noncarcinogenic HI is equal to or less than 1, then action generally is not warranted unless adverse environmental effects are likely.

The screening-level HHRA was presented in Attachment 2 of the Technical Memorandum and represents post-RA conditions. A summary of results is presented in Table 4-2.

Although some excavation areas have estimated residual hazards above 1.0, these slightly elevated hazards are a result of ubiquitous metals. Residual concentrations of manganese in Excavation 23-1 and Excavation 24-5, and vanadium in Excavation 24-3, are similar to background (based on background hypothesis testing using USEPA *ProUCL Software* [2013]) (Shaw, 2013). Past studies conducted at HPNS concluded that the highest concentrations of natural manganese in rocks of coastal California are found in chert and basalt contained in the Franciscan Complex. (TtEMI, 2001a; TtEMI, 2001b) Excavation Areas 23-1 and 24-5 fall within an area where this chert is interbedded with shale and has been mapped or identified. According to the studies, this area has manganese concentrations ranging from 11,000 mg/kg to 30,200 mg/kg.

Residual concentrations of arsenic in Excavation 24-3 are also similar to background (based on background hypothesis testing using USEPA *ProUCL Software* [2013]) (Shaw, 2013). Because the residual hazard exceeds 1.0 it could represent a residual site-related risk or more likely an unusually high background outlier. The slightly elevated hazard is deemed acceptable because the concentrations are comparable to background and the RAOs are met. The RAOs are met because any residual risk is adequately managed by the protective cover. Background manganese data were from Tetra Tech EMI, Inc. (TtEMI, 2001a) and Innovative Technical Solutions, Inc. and Tetra Tech, Inc. (2004), while background arsenic and vanadium data were from Innovative Technical Solutions, Inc. and Tetra Tech, Inc. (2004).

## 4.2 Changes to Soil Excavation Boundaries

This section presents the changes for each excavation area in comparison with the Final ROD (Navy, 2010). Figure 4-1 shows the excavations as presented in the Final ROD and Figure 4-2 indicates the excavations with changes to boundaries based on the tiered approach. Estimated residual risks and hazards were compared with the target risk range of 1E-4 to 1E-6 and target hazard threshold of 1.0, as discussed in the NCP (EPA, 1994) and *Risk Assessment Guidance for Superfund* (RAGS), Part A (EPA, 1989) to determine which tier should be applied to excavation areas.

Sample results currently reported to the Naval Installation Restoration Information System (NIRIS) were used during preparation of figures to present as comprehensive a data set as

possible. NIRIS does not distinguish between old samples and more recent samples that may have been collected as confirmation samples for a remediated location. A comprehensive attempt to manually delete samples that were removed through excavation was made during the preparation of the excavation figures for the Technical Memorandum (Shaw, 2013).

#### 4.2.1 RU-C1

Planned excavation 22-2 will not be included in the RA based on applying the tiered approach (Figure 4-3).

##### Soil Excavation 22-2

The COC identified for Excavation 22-2 is organic lead. Only one sample (IR27GB01) located adjacent to the building foundation (Building 205) at 4.5 feet bgs had an organic lead concentration of 0.93 milligrams per kilogram (mg/kg). The future use for this area is recreational and the recreational RG for organic lead is 0.5 mg/kg (SulTech, 2008), which is the practical quantification limit for organic lead. Data for sample IR27GB01 are not available in the Navy NIRIS database; however, data appear in the *Parcel C Time-critical Removal Action Closeout Report, Hunters Point Shipyard, San Francisco, California* (TtEMI, 2002b) with the following information in the legend: "Result for Pre-excavation Discrete Sidewall Confirmation Sample Exceeds Industrial Cleanup Goal for Soil."

The soil exceedance is located at the wall of a historical building within the Hunters Point Commercial Dry Dock District and the 0.93 mg/kg organic lead concentration is less than five times the RG (Tier 2) (see Table 4-1). There are no other samples in the area showing organic lead in excess of the recreational RG. This excavation area will not be included in the RA.

#### 4.2.2 RU-C4

The boundaries of excavations 23-1, 24-3 and 24-5 were revised based on applying the tiered approach (Figures 4-4 through 4-11, 4-12, and 4-13, respectively). Based on the revised boundaries, excavation 24-3 will not be included in the Remedial Action.

##### Soil Excavation 23-1

Sample results exceeding RGs (primarily metals with the exception of mercury) were screened by applying Tier 1 action levels (ten times the RGs) (see Table 4-1). Sample locations exceeding Tier 1 action levels within the original excavation footprint were identified for excavation and a revised excavation footprint extending a minimum of 5 feet laterally around each exceedance was applied. The areas identified in Figures 4-4 through 4-11 are proposed to be excavated to a minimum of 1 foot deeper than samples exceeding Tier 1 action levels. Confirmation sampling as specified in the Final Remedial Action Work Plan and Sampling Analysis Plan will determine the final excavation depths.

##### Soil Excavation 24-3

The majority of Excavation 24-3 was previously excavated twice (IT Corporation, 1999; TtEMI, 2002b). The estimated risk for Excavation 24-3 is 3.07E-04 and the estimated residual hazard is 1.9. The elevated risk is a result of arsenic, a ubiquitous metal, and the elevated hazard is attributed to background values of vanadium, also a ubiquitous metal. These slightly elevated hazards are deemed acceptable because the metal concentrations are comparable to background. Residual concentrations of arsenic are also comparable to

background (based on background hypothesis testing using EPA *ProUCL Software* [2013]; Attachment 2). No further excavation will take place at this location (Figure 4-12).

### **Soil Excavation 24-5**

Sample results exceeding RGs (primarily metals with the exception of mercury) were screened by applying Tier 2 action levels (five times the RGs) (see Table 4-1). Excavation 24-5 will be reduced to extend approximately 5 feet laterally from sample locations exceeding action levels. This eliminates excavation of areas below action levels within the previous footprint. The excavation depth will be reduced to approximately 7 feet bgs, which is 1 foot deeper than the sample depths showing results exceeding action levels (Figure 4-13). Confirmation sampling as specified in the Final Remedial Action Work Plan and Sampling Analysis Plan will determine the final excavation depths.

The estimated risk for Excavation 24-5 was not calculated because arsenic was the only carcinogen and the residual EPCs were estimated to be below the HPAL background concentrations. The estimated residual hazard is 5.8 (greater than the 1.0 threshold). The hazard is largely attributed to background values of manganese, a ubiquitous metal. Residual manganese concentrations in Excavation 24-5 are comparable to background (based on background hypothesis testing using USEPA *ProUCL Software* [2013]; Shaw, 2013). Past studies conducted at HPNS concluded that the highest concentrations of natural manganese in rocks of coastal California are found in chert and basalt contained in the Franciscan Complex. (TtEMI, 2001a; TtEMI, 2001b) Excavation Areas 23-1 and 24-5 fall within an area where chert interbedded with shale has been mapped or identified. This area according to the studies has manganese concentrations ranging from 11,000 mg/kg to 30,200 mg/kg. Because the HI exceeds 1.0 it could represent a residual site-related risk or possibly an unusually high background outlier. The slightly elevated hazard is deemed acceptable because the concentration for the elevated hazard (manganese) is comparable to background and the RAOs are met. The RAOs are met because any residual risk is adequately managed by the protective cover.

### **4.2.3 RU-C5**

The boundaries of excavation 11-2 were revised based on applying the tiered approach (Figure 4-14).

### **Soil Excavation 11-2**

Approximately 35 percent of Excavation 11-2 was previously excavated between an RA for CERCLA contaminants and TPH in 1999 (IT, 1999), Parcel B excavation in 2000 for tank removals (IT, 2000), Parcel B removal action in 2004 (SulTech, 2004), and the more recent phase I sanitary sewer/storm drain (SS/SD) radiological removal action data report for Parcel C (TtEC, 2012). The southwestern section of the excavation boundary identified by the Final FS (SulTech, 2008) does not contain sample results that exceed RGs and will not be included in the RA.

Sample results exceeding RGs (primarily metals with the exception of mercury) were screened by applying Tier 2 action levels (five times the RGs) (see Table 4-1). For Excavation 11-2, the estimated residual cancer risk is 2.1E-06 and the estimated residual noncancer HI is 0, which are within the risk management range discussed in the NCP (USEPA, 1994). The excavation will be reduced to excavate the one contaminated soil sample location that

exceeds Tier 2 levels. A 10-foot by 10-foot area will be excavated to approximately 7.5 feet bgs, 1 foot below the sample depth known to exceed action levels, as shown in Figure 4-14. A second 10-foot by 10-foot area will be excavated to approximately 7.5 feet bgs, which further reduces the risk and hazard for this area. Confirmation sampling as specified in the Final Remedial Action Work Plan and Sampling Analysis Plan will determine the final excavation depths.

#### 4.2.4 Documentation of Non-Significant Changes

The areas of the following excavations were revised to extend 1 foot vertically from the known extent of contamination rather than 10 feet bgs as described in the Final ROD.

- Soil Excavation 10-3
- Soil Excavation 10-4
- Soil Excavation 11-1
- Soil Excavation 18-2
- Soil Excavation 18-4
- Soil Excavation 24-2
- Soil Excavation 24-4
- Soil Excavation 26-2

### 4.3 Evaluation of Remedy Change for Parcel C

#### 4.3.1 Review of Relevant Guidance

The USEPA has published guidance (USEPA, 1999) for addressing post-ROD changes in RAs. This guidance provides the basis for the Navy's post-ROD remedy change for Parcel C. The guidance states "The lead agency's categorization of a post-ROD change to the Selected Remedy is a site-specific determination and must consider the following as set out in NCP §300.435(c)(2).

- *Scope.* Does the change alter the scope of the remedy (e.g., type of treatment or containment technology, the physical area of the response, remediation goals to be achieved, type and volume of wastes to be addressed)?
- *Performance.* Would the change alter the remedy performance (e.g., treatment levels to be attained, long term reliability of the remedy)?
- *Cost.* Are there significant changes in costs from estimates in the ROD, taking into account the recognized uncertainties associated with the hazardous waste engineering process selected? (Feasibility Study cost estimates are expected to provide an accuracy of +50 percent to -30 percent).

Based on this evaluation, and depending on the extent or scope of modification being considered, the lead agency must make a determination as to the type of change involved (i.e., nonsignificant or minor, significant, or fundamental change). Remedy changes should fall along a continuum from minor to fundamental. Similarly, an aggregate of nonsignificant or significant changes could result in a fundamental change.

Post-ROD changes fit into one of the three following categories:

- *Nonsignificant or Minor Changes* usually arise during design and construction, when modifications are made to the functional specifications of the remedy to address issues such as performance optimization, new technical information, support agency/community concerns and/or cost minimization (e.g., value engineering process). Such changes may affect things such as the type or cost of materials, equipment, facilities, services, and supplies used to implement the remedy. The change will not have a significant impact on the scope, performance, or cost of the remedy.
- *Significant Changes* generally involve a change to a component of a remedy that does not fundamentally alter the overall cleanup approach.
- *Fundamental Changes* involve an appreciable change or changes in the scope, performance, and/or cost or may be a number of significant changes that together have the effect of a fundamental change. An example of a fundamental change is one that results in a reconsideration of the overall waste management approach selected in the original ROD."

### 4.3.2 Evaluation of Remedy Change for Parcel C

The Navy evaluated the Parcel C post-ROD remedy changes against the criteria presented in the above-quoted USEPA guidance, as follows:

#### Scope

The selected remedy remains S-5: Excavation, Disposal, Covers, Soil Vapor Extraction and ICs. However, the total excavation area, and resulting volume, will be reduced from the original 42,000 yd<sup>3</sup> to 22,289 yd<sup>3</sup>. The new screening-level HHRA conducted to address removal to Tier 1 and Tier 2 action levels versus RGs provided the justification that the change in excavation boundaries does not pose a substantial risk to human health. Additionally, the change in excavation boundaries does not change the requirement for the installation of a cover remedy identified in the Final ROD. This cover is anticipated to break the exposure pathway to meet the associated RAOs.

#### Performance

The selected remedy uses Tier 1 and Tier 2 action levels in accordance with the new HHRA to within the 95 percent UCL for the risk range of 1E-4 to 1E-6 and target hazard threshold of 1.0. In addition, the cover, SVE, and ICs all serve to break the pathway of potential exposure for COCs left in place. Therefore, the performance of the remedy is not changing.

#### Cost

The cost identified in the Final ROD, Soil Alternative S-5, was a Capital Cost of \$17,236,000 and an Operations and Maintenance Cost of \$3,552,000. The ESD revisions to Soil Alternative S-5 will reduce the capital cost by approximately 23 percent because of the reduced volume of excavation. The tiered approach will result in an approximate volume reduction of 16,000 cubic yards. The estimated cost for excavation, personnel, soil sampling, backfilling, and soil disposal is approximately \$250 per cubic yard. This equates to a cost reduction of approximately \$4,000,000. The cover, SVE, and ICs are still included in the revised remedial alternative.

### **Type of Change**

Based on this evaluation, the Navy considers these changes to be significant. Application of tiered action levels for the excavation portion of the selected soil remedy will result in changes to the specific numerical RGs identified in the ROD. The tiered approach results in scope reduction and cost minimization but does not fundamentally alter the RAOs or the overall cleanup approach of excavation and protective cover. The protective cover ensures the contaminant pathway is broken and the tiered approach does not result in an unacceptable risk.

### **Administrative Process Requirements**

A notice of availability and a brief description of the ESD will be published in a local newspaper and a copy of the ESD will be provided in the Hunters Point repository and local libraries.

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## 5.0 Support Agency Comments

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Appendix A presents regulatory comments received on the Draft ESD and the Navy's response to these comments. Revisions based on the agency comments were incorporated into this final version of the ESD.

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## 6.0 Statutory and Regulatory Determinations

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The modifications to the RA for the Final ROD set forth in this ESD are significant but not fundamental. The RA remains protective of human health and the environment and continues to comply with applicable or relevant and appropriate requirements identified in the Final ROD, in accordance with CERCLA Section 121(d)(2) and NCP Section 300.430(f)(1)(ii)(B)(1) and (2).

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Base Closure Manager  
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Date

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Ms. Angeles Herrera  
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Date

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Mr. Bruce H. Wolfe  
Executive Officer  
California Environmental Protection Agency  
California Regional Water Quality Control Board, San Francisco Bay Region

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Date

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## 7.0 Public Participation

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This ESD will become part of the Administrative Record Files for the site (NCP, 40 CFR Sections 300.435(c)(2)(i)(A) and 300.825 (a)(2)). A notice of public availability and a brief description of the ESD will be published in a major local newspaper as required by the NCP, 40 CFR Sections 300.435(c)(2)(i)(B). The ESD will be available for public review at the following locations:

San Francisco Main Library  
100 Larkin Street  
Government Information Center, 5th Floor  
San Francisco, CA 94102  
Phone: (415) 557-4500

Information Repository  
Hunters Point Shipyard Site Trailer  
690 Hudson Avenue  
San Francisco, CA 94124

The complete Administrative Record is located at 1220 Pacific Highway, San Diego, California, and is maintained by Ms. Diana Silva, Naval Facilities Engineering Command, Southwest Administration Record Manager, phone: (619) 532-3676.

For access to the Administrative Record or additional information on the Parcel C remedial activities, contact:

Mr. Thomas Macchiarella  
Base Realignment and Closure Program Environmental Coordinator  
Base Realignment and Closure Program Management Office West  
1455 Frazee Road, Suite 900  
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Phone: (619) 532-0987

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**Tables**

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**TABLE 2-1**  
Previous Studies and Removal Actions

Title	Date	Description of Removal Activities
Phase I and II UST Removal Action	1991-1993	Twenty-one USTs were removed and seven USTs were closed in place. The USTs at former Parcel C ranged in size from 122 to 210,000 gallons, and tank contents included gasoline, diesel, waste oil, hydraulic fluids, solvents, or fuel oils.
Sandblast Grit Removal Action	1991-1995	A total of 4,665 tons of discarded sandblast grit was removed throughout HPNS. An estimated 101 tons of grit was generated from Dry Dock 4, located in former Parcel C.
Storm Drain Sediment Removal Action	1996-1997	A total of 1,200 tons of contaminated sediment was removed from storm drain lines and appurtenances; approximately 800 feet of drainage culverts under Dry Dock 4 were cleaned.
Parcel B Remedial Action (IR-06)	1997-1998	Soil was removed at 19 excavation sites at the former tank farm in IR-06; the excavations were sampled and the sites were backfilled.
Facility wide Exploratory Excavations	1997-1999	Soil was removed at 18 sites facility wide, the excavations were sampled, and the sites were backfilled.
Soil Vapor Extraction Treatability Study	2000-2001	A soil vapor extraction treatability study was conducted at Building 134 in IR-25.
Time-critical Removal Action (TCRA)	2000-2002	Steam and fuel lines were closed in place or removed. Soil was removed at 46 of the 121 sites, contamination was delineated at 38 sites, and the remaining sites met the cleanup goals established for this action.
Parcel B Remedial Action – addendum	2000-2004	An industrial drain line between Buildings 123 and 134 was excavated, about 2,050 yd <sup>3</sup> of soil were removed, the excavation was sampled, and the site was backfilled.
Degreaser Pit/Separator Demolition at RU-C5	2004	Removal of the degreaser pit and oil-water separator occurred from Building 134.
Groundwater Treatability Study (RU-C5)	2004-2005	A groundwater treatability study using in situ bioremediation was conducted at RU-C5 using sequential use of bio-additives to facilitate anaerobic conditions followed by aerobic conditions to enhance degradation of chlorinated organic compounds.
Groundwater Treatability Study (RU-C4)	2004-2005	A groundwater treatability study was conducted using ZVI at Building 272.
Emergency Removal Action Closeout Report Encapsulation of Drainage Culvert Sediment at Dry Dock 4	2003	Contaminated sediment in two culverts under Dry Dock 4 was successfully encapsulated.
TPH Program Corrective Action Implementation Soil Removal	2005	Soil was removed at two Parcel C sites located in IR-28 (CAA 3R in Block 20B and CAA 2R in Block 24); at CAA 2R, the excavation was 2 feet deep and 12 yd <sup>3</sup> was removed; at CAA 3R, the excavation was 4 feet deep and 12 yd <sup>3</sup> were removed.
Parcel B Storm Drain and Sanitary Sewer Removal Action	2007	A total of 1,892 linear feet of pipeline was removed at IR-06 and IR-25 in Parcel C; about 3,086 yd <sup>3</sup> of material were removed. The concrete, clay, and cement pipelines were tested for radiological contamination and disposed of appropriately offsite.

**TABLE 2-1**

## Previous Studies and Removal Actions

<b>Title</b>	<b>Date</b>	<b>Description of Removal Activities</b>
Groundwater Treatability Studies at RU-C1 and RU-C5	2008-2012	Groundwater treatability studies using ZVI injection points were performed at RU-C1 and RU-C5.
Radiological TCRA	2010-ongoing	Initial design work for Parcel C started in 2010. Field work is scheduled for completion in 2014.

Note:

<sup>a</sup> The documents listed are available in the Administrative Record and provide detailed information used to support remedy selection at Parcel C.

CAA = Corrective Action Area

yd<sup>3</sup> = cubic yard

TCRA = time-critical removal action

TPH = total petroleum hydrocarbons

UST = underground storage tank

yd<sup>3</sup> = cubic yard

ZVI = zero-valent iron

**TABLE 4-1**  
**Action Levels**

Site	Tier	COC	ROD RG (mg/kg)	Action Level (mg/kg)
<b>RU-C1</b>				
22-2	Tier 2	Organic Lead	<b>0.5</b>	<b>2.5</b>
<b>RU-C4</b>				
23-1	Tier 1	<b>Aroclor-1254</b>	<b>0.093</b>	<b>0.93</b>
		<b>Aroclor-1260</b>	<b>0.21</b>	<b>2.1</b>
		<b>Arsenic</b>	<b>11.1</b>	<b>111</b>
		Benzo(a)anthracene	0.37	0.37 <sup>a</sup>
		Benzo(a)pyrene	0.33	0.33 <sup>a</sup>
		Benzo(b)fluoranthene	0.34	0.34 <sup>a</sup>
		Benzo(k)fluoranthene	0.34	0.34 <sup>a</sup>
		Cadmium	<b>3.5</b>	<b>35</b>
		Chrysene	3.3	3.3 <sup>a</sup>
		<b>Copper</b>	<b>160</b>	<b>1,600</b>
		Dibenz(a,h,)anthracene	0.33	0.33 <sup>a</sup>
		Indeno(1,2,3-cd)pyrene	0.35	0.35 <sup>a</sup>
		<b>Iron</b>	<b>58,000</b>	<b>580,000</b>
		<b>Lead</b>	<b>155</b>	<b>1,550</b>
		<b>Manganese</b>	<b>1,431</b>	<b>14,310</b>
		Mercury	2.28	2.28 <sup>a</sup>
		Naphthalene	1.7	1.7 <sup>a</sup>
		<b>Organic Lead</b>	<b>0.5</b>	<b>5</b>
		<b>Thallium</b>	<b>5</b>	<b>50</b>
		<b>Vanadium</b>	<b>117</b>	<b>1,170</b>
		<b>Zinc</b>	<b>370</b>	<b>3,700</b>
		TPH	3,500	3,500 <sup>a</sup>
24-3	Tier 3	Arsenic	11.1	11.1
		Benzo(a)pyrene	0.33	0.33 <sup>a</sup>
		Benzo(b)fluoranthene	0.34	0.34 <sup>a</sup>
		Benzo(k)fluoranthene	0.34	0.34 <sup>a</sup>
		Vanadium	117	117
24-5	Tier 2	<b>Arsenic</b>	<b>11.1</b>	<b>55.5</b>
		<b>Copper</b>	<b>160</b>	<b>800</b>
		<b>Manganese</b>	<b>1,431</b>	<b>7,155</b>
		<b>Thallium</b>	<b>5</b>	<b>25</b>

**TABLE 4-1**  
Action Levels

Site	Tier	COC	ROD RG (mg/kg)	Action Level (mg/kg)
<b>RU-C5</b>				
11-2	Tier 2	1,2-Dichloroethane	0.28	0.28 <sup>a</sup>
		1,4-Dichlorobenzene	2	2 <sup>a</sup>
		<b>Aroclor-1260</b>	<b>0.21</b>	<b>1.05</b>
		Benzo(a)anthracene	0.37	0.37 <sup>a</sup>
		Benzo(a)pyrene	0.33	0.33 <sup>a</sup>
		Benzo(b)fluoranthene	0.34	0.34 <sup>a</sup>
		Benzo(k)fluoranthene	0.34	0.34 <sup>a</sup>
		Chrysene	3.3	3.3 <sup>a</sup>
		<b>Copper</b>	<b>160</b>	<b>800</b>
		Dibenz(a,h)anthracene	0.33	0.33 <sup>a</sup>
		Indeno(1,2,3-cd)pyrene	0.35	0.35 <sup>a</sup>
		<b>Manganese</b>	<b>1,431</b>	<b>7,155</b>
		Tetrachloroethene	0.48	0.48 <sup>a</sup>
		Trichloroethene	2.9	2.9 <sup>a</sup>
		Vinyl chloride	0.024	0.024 <sup>a</sup>

Notes:

<sup>a</sup> Action levels for VOCs, TPH, and PAHs are equal to the RGs established in the Final ROD (Navy, 2010)

**Bold** indicates RG and Action Level are different values

COC = contaminant of concern

mg/kg = milligram per kilogram

PAH = polycyclic aromatic hydrocarbon

ROD = Record of Decision

RG = remedial goal

RU = remedial unit

TPH = total petroleum hydrocarbons

VOC = volatile organic compound



**TABLE 4-2**  
Screening-Level HHRA Summary

Excavation Area	Estimated Residual Cancer Risk	Estimated Residual Noncancer HI	Comments
22-2	0.0E+00 <sup>a</sup>	0 <sup>a</sup>	Acceptable
23-1	4.2E-06	4.4	Within acceptable risk range, HI without HPAL COCs = 1.5 <sup>b</sup>
24-3	3.07E-04	1.9	Above risk range, CR without HPAL COC = 1.5E-05 <sup>c</sup> ; Above HI threshold, HI without HPAL COC = 0.1 <sup>b</sup>
24-4	0.0E+00 <sup>a</sup>	0.2	Acceptable
24-5	0.0E+00 <sup>a</sup>	5.8	HI without HPAL COCs = 4.1 <sup>b</sup>
10-3	3.1E-06	0 <sup>a</sup>	Within acceptable risk range
10-4	1.1E-07	0 <sup>a</sup>	Acceptable
11-2	2.1E-06	0 <sup>a</sup>	Within acceptable risk range

Notes:

<sup>a</sup> Risk driver (metal) was determined to be consistent with background concentrations and eliminated from the calculation resulting in a risk of zero.

<sup>b</sup> HI without HPAL COC was estimated by subtracting HQ associated with HPAL from total estimated HI.

<sup>c</sup> CR without HPAL COC was estimated by subtracting CR associated with HPAL from total CR.

COC = contaminant of concern

CR = cancer risk

HI = hazard index

HPAL = Hunters Point ambient level

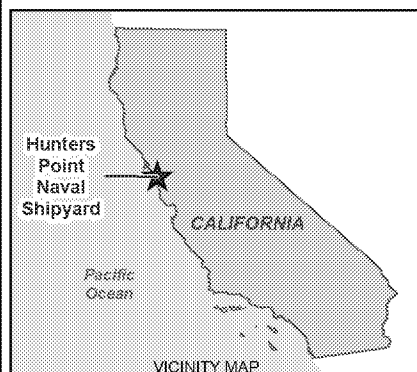
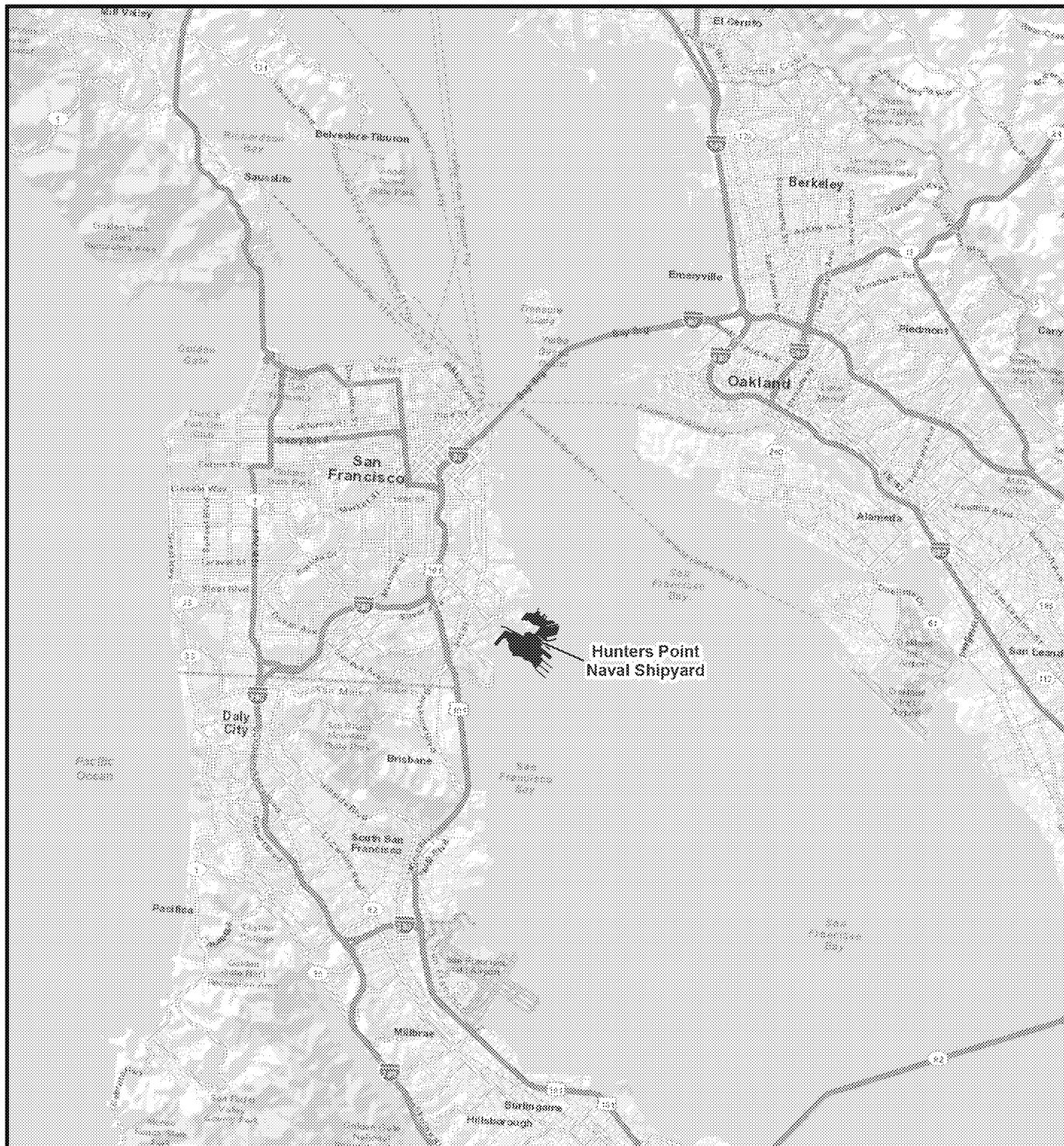
HQ = hazard quotient

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## Figures

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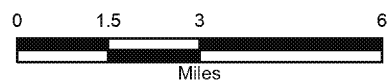
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### LEGEND

 HUNTERS POINT NAVAL SHIPYARD

SOURCE:  
ESRI ArcGIS Online Web Service,  
Streets



### Regional Location

Explanation of Significant Differences to the  
Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California

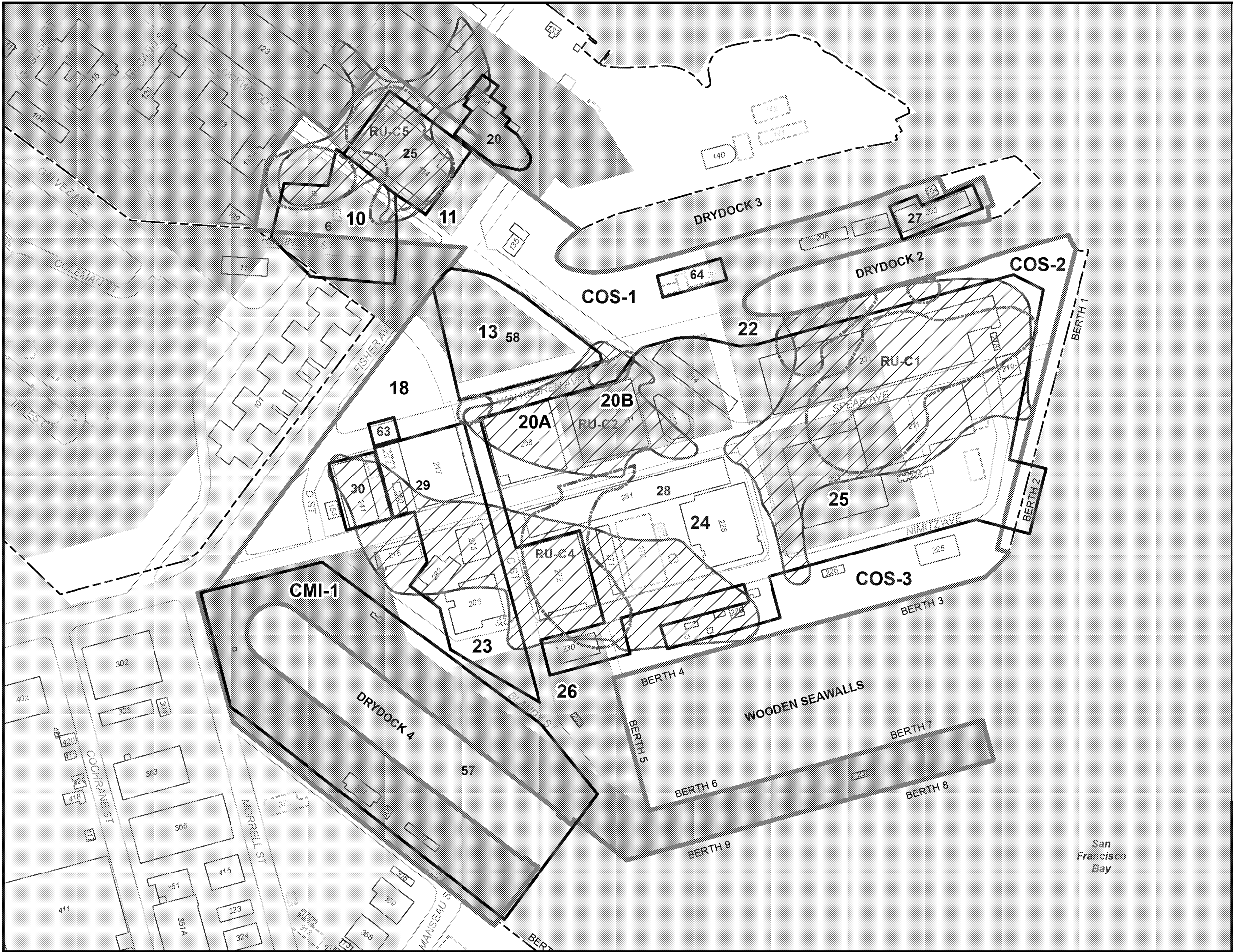


FIGURE

**2-1**

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**LEGEND**

**LANDUSE CATEGORY**



- OPEN SPACE
- PARCEL C MIXED USE
- EDUCATIONAL/CULTURAL
- HUNTERS POINT VILLAGE CENTER
- HUNTERS POINT HILL RESIDENTIAL
- SHIPYARD NORTH RESIDENTIAL
- SHIPYARD RESEARCH AND DEVELOPMENT
- SHIPYARD SOUTH MULTI-USE DISTRICT
- MARITIME/INDUSTRIAL
- REMEDIAL UNIT BOUNDARY
- GROUNDWATER PLUME AREA
- PARCEL C IRP SITES
- PARCEL C BOUNDARY
- ROAD EDGE OF PAVEMENT
- BUILDING - EXISTING
- BUILDING - DEMOLISHED
- HUNTERS POINT NAVAL SHIPYARD BOUNDARY

NOTE:  
1. IRP = Installation Restoration Program

0 130 260 520  
Feet

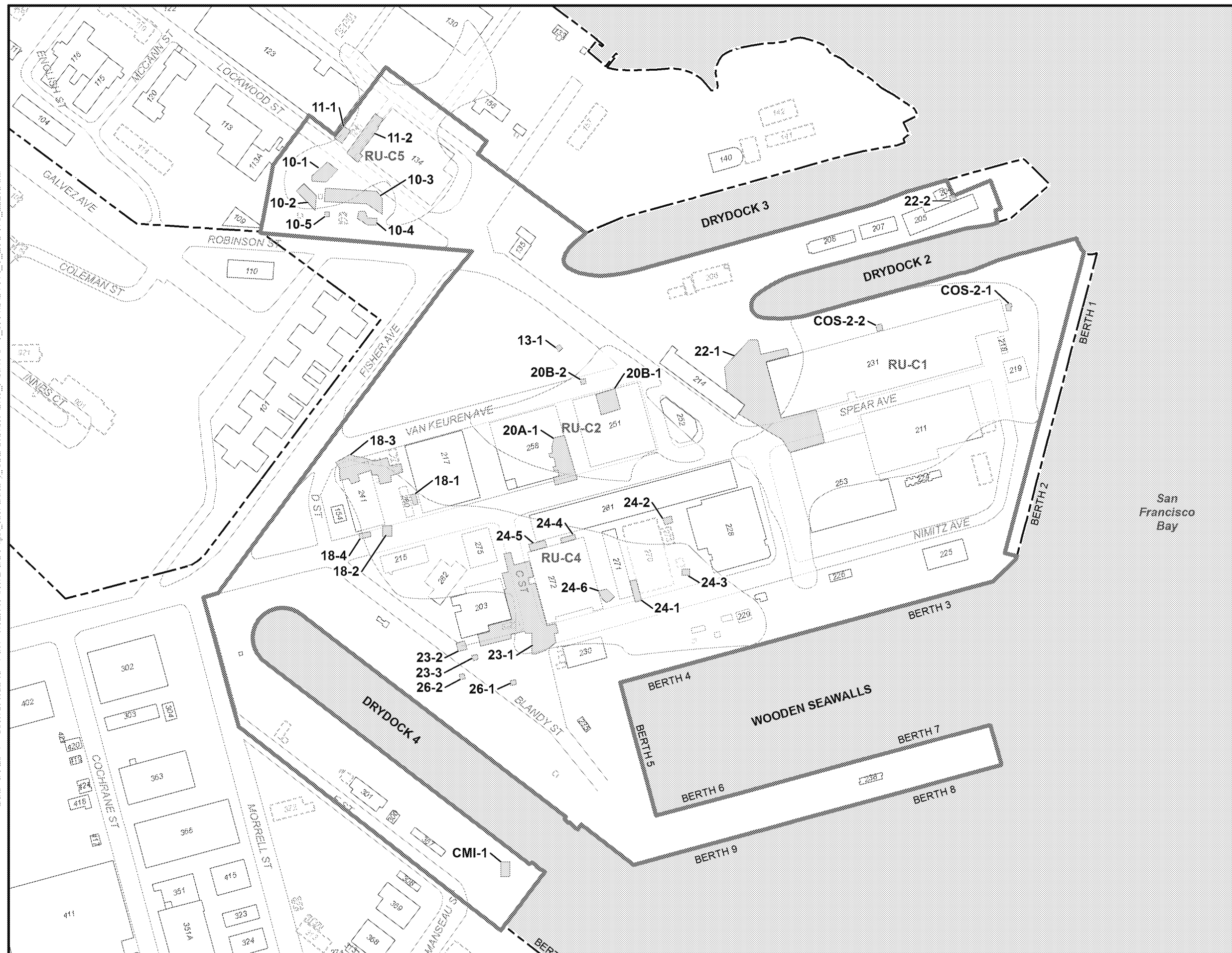
**Parcel C Location**

Explanation of Significant Differences to the  
Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California








  **FIGURE 2-2**

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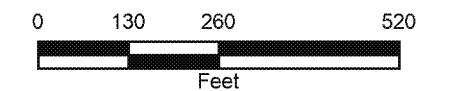


## LEGEND

- |   |  |
|---|--|
|  | FORMER PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA<br>(FINAL RECORD OF DECISION, NAVY 2010) |
|  | REMEDIAL UNIT (RU) BOUNDARY  |
|  | ROAD EDGE OF PAVEMENT  |
|  | BUILDING - EXISTING  |
|  | BUILDING - DEMOLISHED  |
|  | PARCEL C BOUNDARY  |
|  | HUNTERS POINT NAVAL SHIPYARD BOUNDARY  |

San  
Francisco  
Bay

NOTES:  
ROD = Record of Decision



**Excavation Areas as  
Presented in the Final ROD**

Explanation of Significant Differences to the  
Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California

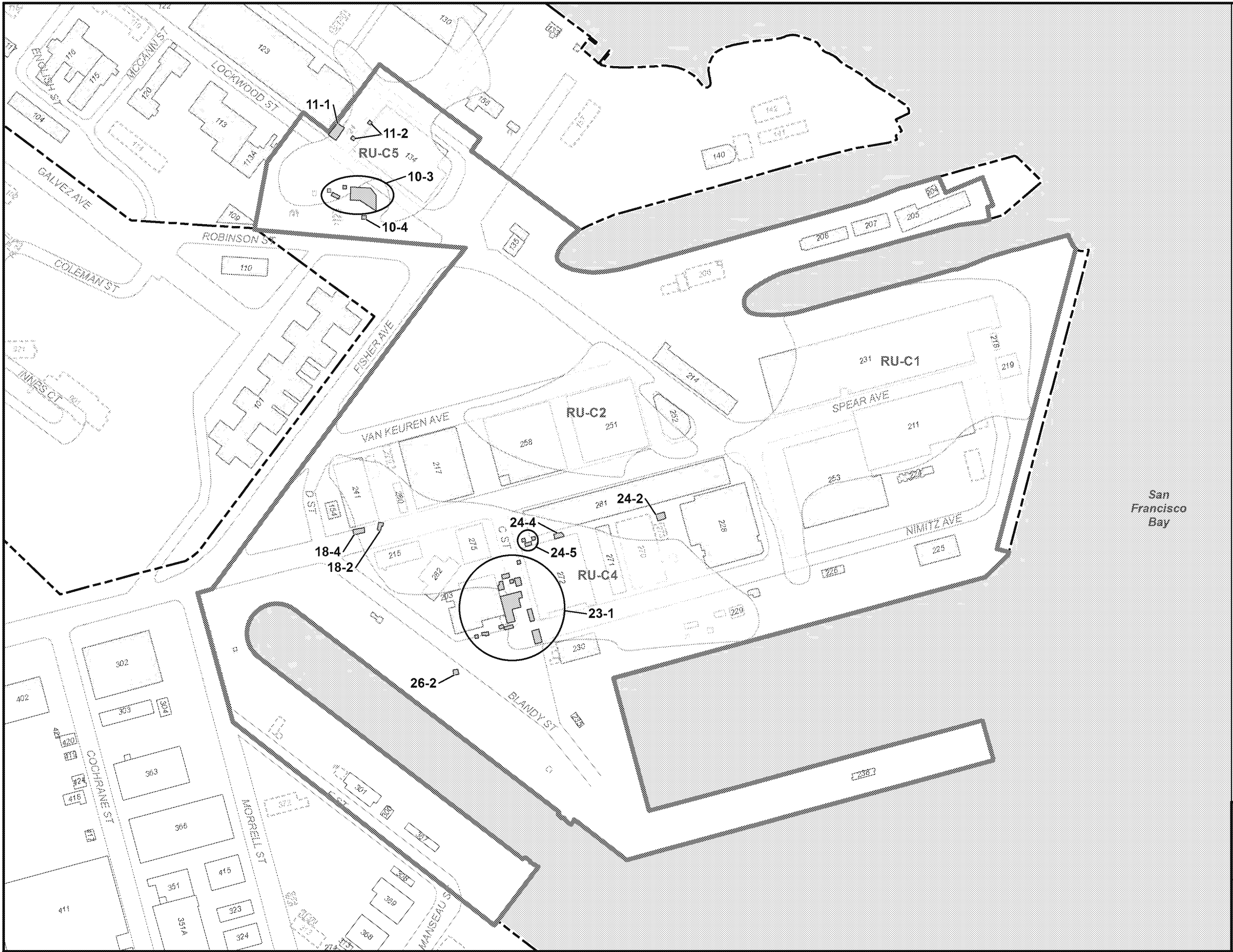


FIGURE

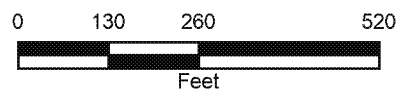
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- LEGEND**
- REVISED PARCEL C REMEDIAL ACTION EXCAVATION AREA
  - REMEDIAL UNIT (RU) BOUNDARY
  - ROAD EDGE OF PAVEMENT
  - BUILDING - EXISTING
  - BUILDING - DEMOLISHED
  - PARCEL C BOUNDARY
  - HUNTERS POINT NAVAL SHIPYARD BOUNDARY



**Revised Excavation Areas**

Explanation of Significant Differences to the  
Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California

FIGURE

**4-2**

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**LEGEND**

- SOIL SAMPLE > 10X RG
- ◆ SOIL SAMPLE > 5X RG AND < 10X RG
- ⬢ SOIL SAMPLE > RG AND < 5X RG
- ⬢ SOIL SAMPLE < RG
- ▨ FORMER UNDERGROUND STORAGE TANK
- ▤ FORMER PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA (FINAL RECORD OF DECISION, NAVY 2010)
- ▭ BUILDING - EXISTING
- ▭ C PARCEL BOUNDARY

**PREVIOUS EXCAVATION AREAS**

PRC ENVIRONMENTAL MANAGEMENT, INC., 1994, DRAFT SUMMARY REPORT, PHASE I AND PHASE II UST REMOVALS AND CLOSURES IN PLACE, JULY 12

Recreational Contaminants of Concern	Tier 2 Action Level
Organic Lead	2.5 mg/kg

Tier 2 action level is equal to 5 x RG

mg/kg = milligrams per kilogram  
RG = Remediation Goal  
SS/SD = Sanitary Sewer/Storm Drain  
UST = Underground Storage Tank  
NIRIS = Naval Installation Restoration Information Solution

**SAMPLE NOTE:**

1. IR27GB01 was a sidewall sample collected near the building and Organic Lead concentration was less than 5x the RG. Therefore, location will not be excavated.

**NOTES:**

1. Only samples inside Former Planned Parcel C Remedial Action Excavation Area (Final Record of Decision, Navy 2010) are shown.

2. Organic lead data not available in NIRIS, but was extracted from TtEMI, 2002b, *Parcel C Time Critical Removal Action Closeout Report, Hunters Point Shipyard, San Francisco, CA* and included in the Final Record of Decision (Navy, 2010).

05Feet

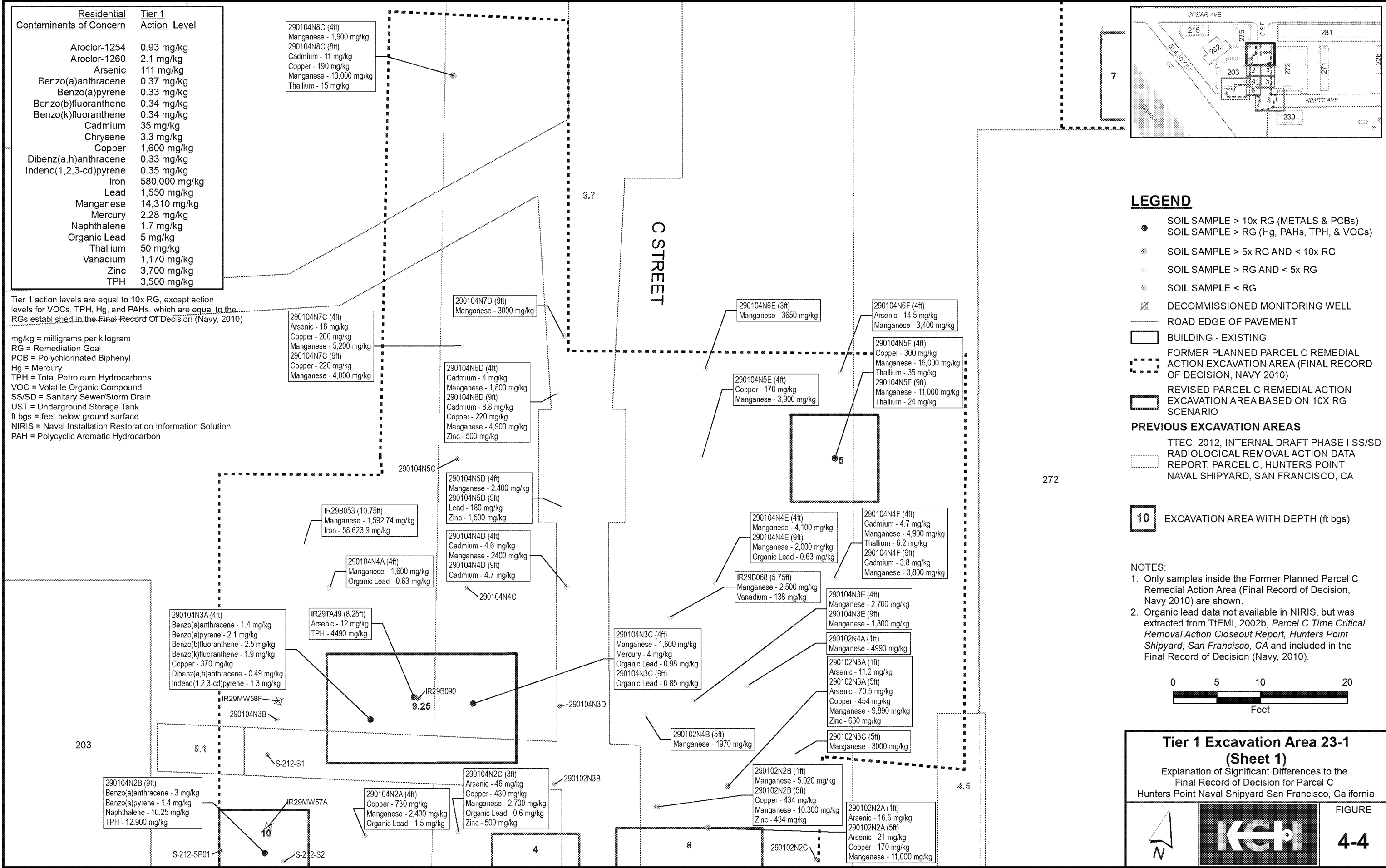
Excavation Area 22-2

Explanation of Significant Differences to the Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California

FIGURE  
4-3

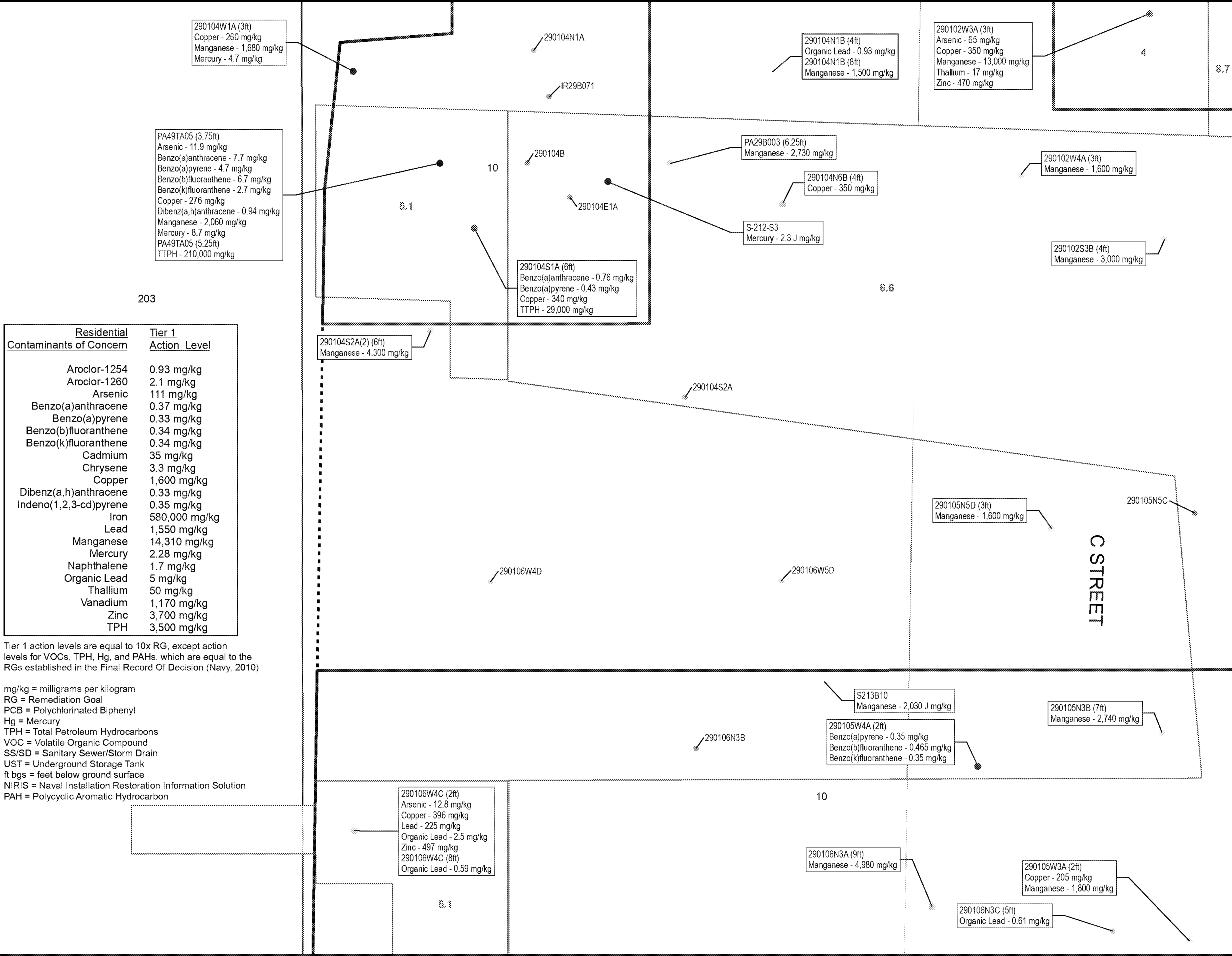
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SPEAR AVE  
215  
275  
281  
203  
272  
271  
230  
NIMITZ AVE  
228

### LEGEND

- SOIL SAMPLE > 10x RG (METALS & PCBs)  
SOIL SAMPLE > RG (Hg, PAHs, TPH, & VOCs)
- ◆ SOIL SAMPLE > 5x RG AND < 10x RG
- ⬢ SOIL SAMPLE > RG AND < 5x RG
- ⬢ SOIL SAMPLE < RG
- ⊠ DECOMMISSIONED MONITORING WELL
- ROAD EDGE OF PAVEMENT
- ▭ BUILDING - EXISTING
- ⬢ FORMER PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA (FINAL RECORD OF DECISION, NAVY 2010)
- ⬢ REVISED PARCEL C REMEDIAL ACTION EXCAVATION AREA BASED ON 10X RG SCENARIO

### PREVIOUS EXCAVATION AREAS

TTEC, 2012, INTERNAL DRAFT PHASE I SS/SD RADIOLOGICAL REMOVAL ACTION DATA REPORT, PARCEL C, HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CA

**10** EXCAVATION AREA WITH DEPTH (ft bgs)

NOTES:

- Only samples inside the Former Planned Parcel C Remedial Action Area (Final Record of Decision, Navy 2010) are shown.
- Organic lead data not available in NIRIS, but was extracted from TtEMI, 2002b, *Parcel C Time Critical Removal Action Closeout Report, Hunters Point Shipyard, San Francisco, CA* and included in the Final Record of Decision (Navy, 2010).

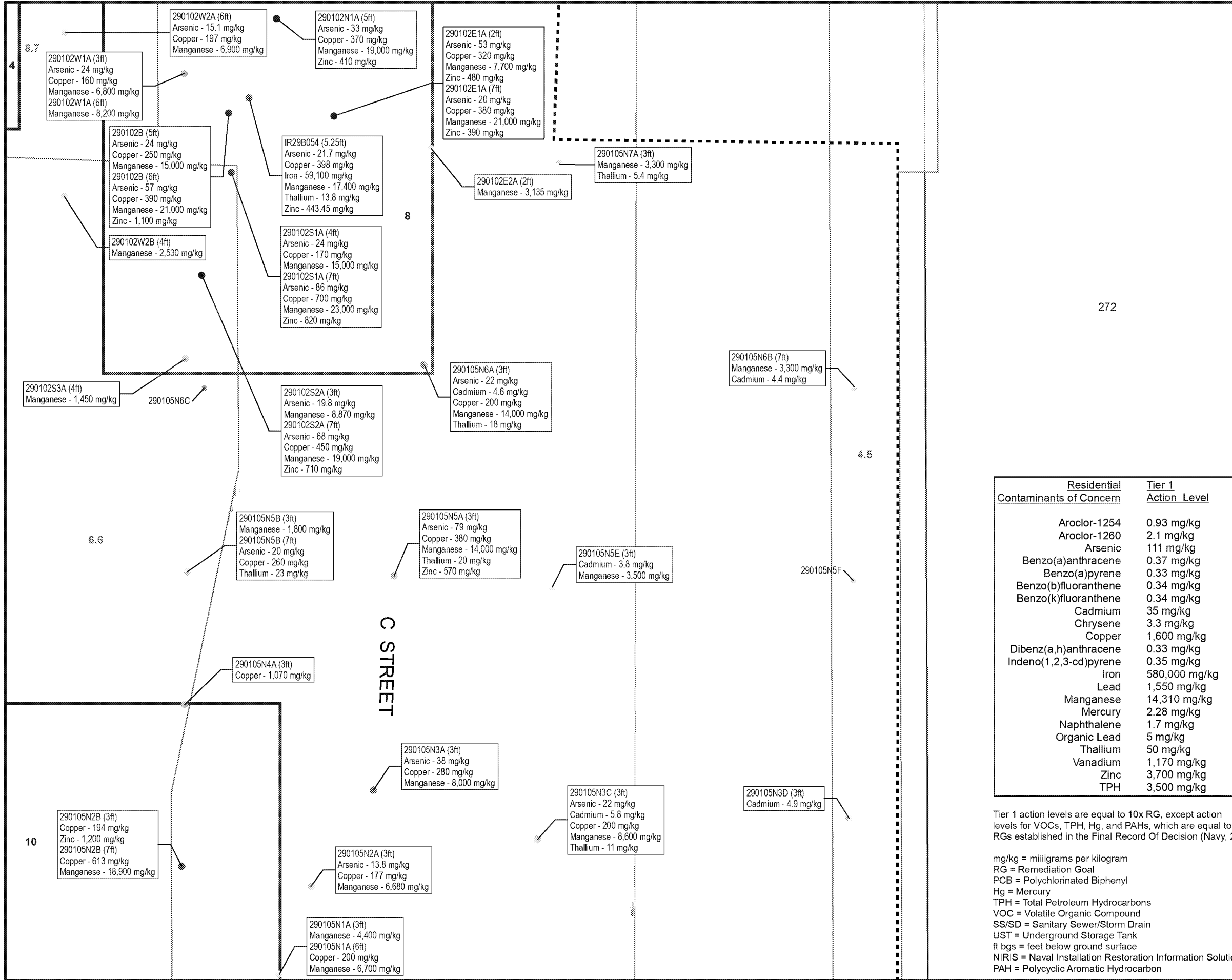
0 2.5 5 10  
Feet

### Tier 1 Excavation Area 23-1 (Sheet 2)

Explanation of Significant Differences to the Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California

FIGURE  
**4-5**

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### LEGEND

- SOIL SAMPLE > 10x RG (METALS & PCBs)
- SOIL SAMPLE > RG (Hg, PAHs, TPH, & VOCs)
- SOIL SAMPLE > 5x RG AND < 10x RG
- SOIL SAMPLE > RG AND < 5x RG
- SOIL SAMPLE < RG
- ⊗ DECOMMISSIONED MONITORING WELL
- ROAD EDGE OF PAVEMENT
- ▭ BUILDING - EXISTING
- ▭ FORMER PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA (FINAL RECORD OF DECISION, NAVY 2010)
- ▭ REVISED PARCEL C REMEDIAL ACTION EXCAVATION AREA BASED ON 10X RG SCENARIO

### PREVIOUS EXCAVATION AREA

TTEC, 2012, INTERNAL DRAFT PHASE I SS/SD RADIOLOGICAL REMOVAL ACTION DATA REPORT, PARCEL C, HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CA

10

EXCAVATION AREA WITH DEPTH (ft bgs)

### NOTES:

- Only samples inside the Former Planned Parcel C Remedial Action Area (Final Record of Decision, Navy 2010) are shown.
- Organic lead data not available in NIRIS, but was extracted from TtEMI, 2002b, *Parcel C Time Critical Removal Action Closeout Report, Hunters Point Shipyard, San Francisco, CA* and included in the Final Record of Decision (Navy, 2010).

02.5510

Feet

Tier 1 Excavation Area 23-1 (Sheet 3)

Explanation of Significant Differences to the Final Record of Decision for Parcel C

Hunters Point Naval Shipyard San Francisco, California

FIGURE 4-6

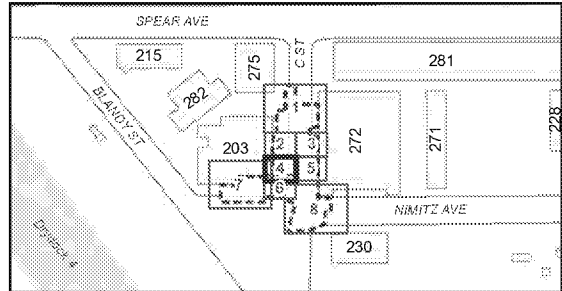
Residential Contaminants of Concern	Tier 1 Action Level
Aroclor-1254	0.93 mg/kg
Aroclor-1260	2.1 mg/kg
Arsenic	111 mg/kg
Benzo(a)anthracene	0.37 mg/kg
Benzo(a)pyrene	0.33 mg/kg
Benzo(b)fluoranthene	0.34 mg/kg
Benzo(k)fluoranthene	0.34 mg/kg
Cadmium	35 mg/kg
Chrysene	3.3 mg/kg
Copper	1,600 mg/kg
Dibenz(a,h)anthracene	0.33 mg/kg
Indeno(1,2,3-cd)pyrene	0.35 mg/kg
Iron	580,000 mg/kg
Lead	1,550 mg/kg
Manganese	14,310 mg/kg
Mercury	2.28 mg/kg
Naphthalene	1.7 mg/kg
Organic Lead	5 mg/kg
Thallium	50 mg/kg
Vanadium	1,170 mg/kg
Zinc	3,700 mg/kg
TPH	3,500 mg/kg

Tier 1 action levels are equal to 10x RG, except action levels for VOCs, TPH, Hg, and PAHs, which are equal to the RGs established in the Final Record Of Decision (Navy, 2010)







mg/kg = milligrams per kilogram  
RG = Remediation Goal  
PCB = Polychlorinated Biphenyl  
Hg = Mercury  
TPH = Total Petroleum Hydrocarbons  
VOC = Volatile Organic Compound  
SS/SD = Sanitary Sewer/Storm Drain  
UST = Underground Storage Tank  
ft bgs = feet below ground surface  
NIRIS = Naval Installation Restoration Information Solution  
PAH = Polycyclic Aromatic Hydrocarbon

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mg/kg = milligrams per kilogram  
RG = Remediation Goal  
PCB = Polychlorinated Biphenyl  
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VOC = Volatile Organic Compound  
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UST = Underground Storage Tank  
ft bgs = feet below ground surface  
NIRIS = Naval Installation Restoration Information Solution  
PAH = Polycyclic Aromatic Hydrocarbon



- SOIL SAMPLE > 10x RG (METALS & PCBs)  
SOIL SAMPLE > RG (Hg, PAHs, TPH, & VOCs)
- ◆ SOIL SAMPLE > 5x RG AND < 10x RG
- ◇ SOIL SAMPLE > RG AND < 5x RG
- ◇ SOIL SAMPLE < RG

- |   |   |
|---|---|
|  | DECOMMISSIONED MONITORING WELL  |
|  | ROAD EDGE OF PAVEMENT   |
|  | BUILDING - EXISTING   |
|  | BUILDING - DEMOLISHED   |
|  | FORMER PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA (FINAL RECORD OF DECISION, NAVY 2010) |
|  | REVISED PARCEL C REMEDIAL ACTION EXCAVATION AREA BASED ON 10X RG SCENARIO                     |

## PREVIOUS EXCAVATION AREAS

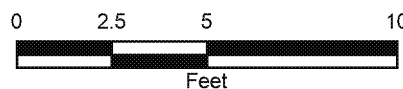
PRC ENVIRONMENTAL MANAGEMENT, INC.,  
1994, DRAFT SUMMARY REPORT, PHASE I  
AND PHASE II UST REMOVALS AND  
CLOSURES IN PLACE, JULY 12

TTEC, 2012, INTERNAL DRAFT PHASE I SS/SD  
RADIOLOGICAL REMOVAL ACTION DATA  
REPORT, PARCEL C, HUNTERS POINT  
NAVAL SHIPYARD, SAN FRANCISCO, CA

- | 10  | EXCAVATION AREA WITH DEPTH (ft bgs) |
|-----|-------------------------------------|
| 1   | 1                                   |
| 2   | 2                                   |
| 3   | 3                                   |
| 4   | 4                                   |
| 5   | 5                                   |
| 6   | 6                                   |
| 7   | 7                                   |
| 8   | 8                                   |
| 9   | 9                                   |
| 10  | 10                                  |
| 11  | 11                                  |
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| 13  | 13                                  |
| 14  | 14                                  |
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| 18  | 18                                  |
| 19  | 19                                  |
| 20  | 20                                  |
| 21  | 21                                  |
| 22  | 22                                  |
| 23  | 23                                  |
| 24  | 24                                  |
| 25  | 25                                  |
| 26  | 26                                  |
| 27  | 27                                  |
| 28  | 28                                  |
| 29  | 29                                  |
| 30  | 30                                  |
| 31  | 31                                  |
| 32  | 32                                  |
| 33  | 33                                  |
| 34  | 34                                  |
| 35  | 35                                  |
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| 40  | 40                                  |
| 41  | 41                                  |
| 42  | 42                                  |
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| 46  | 46                                  |
| 47  | 47                                  |
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| 49  | 49                                  |
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| 90  | 90                                  |
| 91  | 91                                  |
| 92  | 92                                  |
| 93  | 93                                  |
| 94  | 94                                  |
| 95  | 95                                  |
| 96  | 96                                  |
| 97  | 97                                  |
| 98  | 98                                  |
| 99  | 99                                  |
| 100 | 100                                 |

NOTES:

1. Only samples inside the Former Planned Parcel C Remedial Action Area (Final Record of Decision, Navy 2010) are shown.
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**Tier 1 Excavation Area 23-1  
(Sheet 4)**

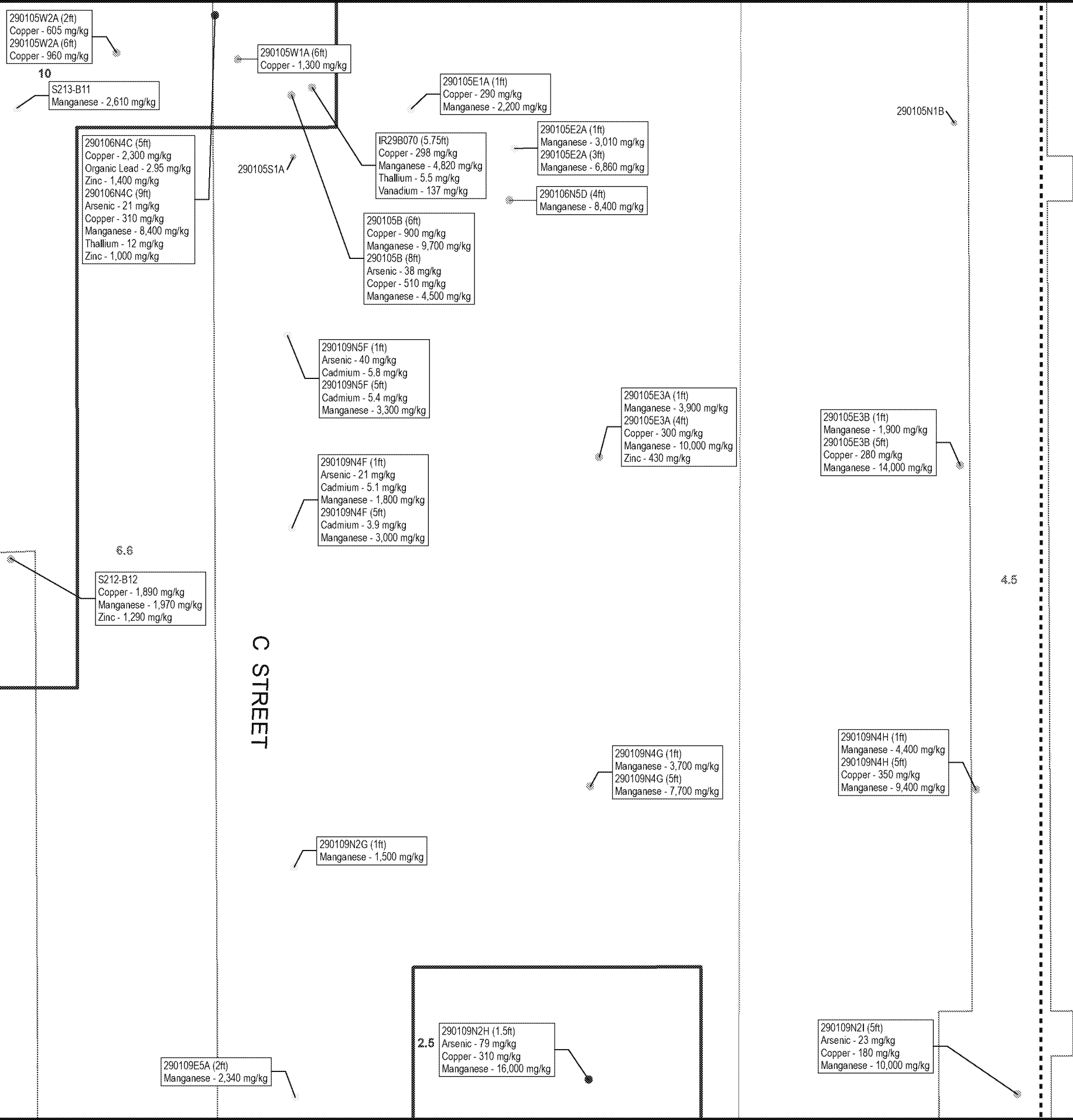
Explanation of Significant Differences to the  
Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California



FIGURE

4-7

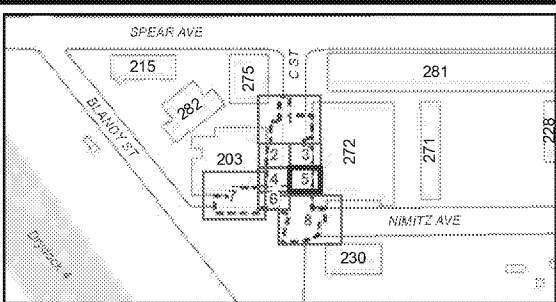
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Residential Contaminants of Concern	Tier 1 Action Level
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Benzo(a)pyrene	0.33 mg/kg
Benzo(b)fluoranthene	0.34 mg/kg
Benzo(k)fluoranthene	0.34 mg/kg
Cadmium	35 mg/kg
Chrysene	3.3 mg/kg
Copper	1,600 mg/kg
Dibenz(a,h)anthracene	0.33 mg/kg
Indeno(1,2,3-cd)pyrene	0.35 mg/kg
Iron	580,000 mg/kg
Lead	1,550 mg/kg
Manganese	14,310 mg/kg
Mercury	2.28 mg/kg
Naphthalene	1.7 mg/kg
Organic Lead	5 mg/kg
Thallium	50 mg/kg
Vanadium	1,170 mg/kg
Zinc	3,700 mg/kg
TPH	3,500 mg/kg

Tier 1 action levels are equal to 10x RG, except action levels for VOCs, TPH, Hg, and PAHs, which are equal to the RGs established in the Final Record Of Decision (Navy, 2010)

mg/kg = milligrams per kilogram  
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ft bgs = feet below ground surface  
NIRIS = Naval Installation Restoration Information Solution  
PAH = Polycyclic Aromatic Hydrocarbon



**LEGEND**

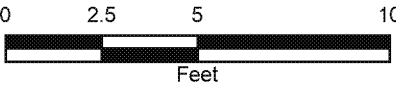
- SOIL SAMPLE > 10x RG (METALS & PCBs)
- SOIL SAMPLE > RG (Hg, PAHs, TPH, & VOCs)
- SOIL SAMPLE > 5x RG AND < 10x RG
- SOIL SAMPLE > RG AND < 5x RG
- SOIL SAMPLE < RG
- DECOMMISSIONED MONITORING WELL
- ROAD EDGE OF PAVEMENT
- BUILDING - EXISTING
- FORMER PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA (FINAL RECORD OF DECISION, NAVY 2010)
- REVISED PARCEL C REMEDIAL ACTION EXCAVATION AREA BASED ON 10X RG SCENARIO

**PREVIOUS EXCAVATION AREAS**

TTEC, 2012, INTERNAL DRAFT PHASE I SS/SD RADIOLOGICAL REMOVAL ACTION DATA REPORT, PARCEL C, HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CA

10 EXCAVATION AREA WITH DEPTH (ft bgs)

- NOTES:
- Only samples inside the Former Planned Parcel C Remedial Action Area (Final Record of Decision, Navy 2010) are shown.
  - Organic lead data not available in NIRIS, but was extracted from TtEMI, 2002b, *Parcel C Time Critical Removal Action Closeout Report, Hunters Point Shipyard, San Francisco, CA* and included in the Final Record of Decision (Navy, 2010).



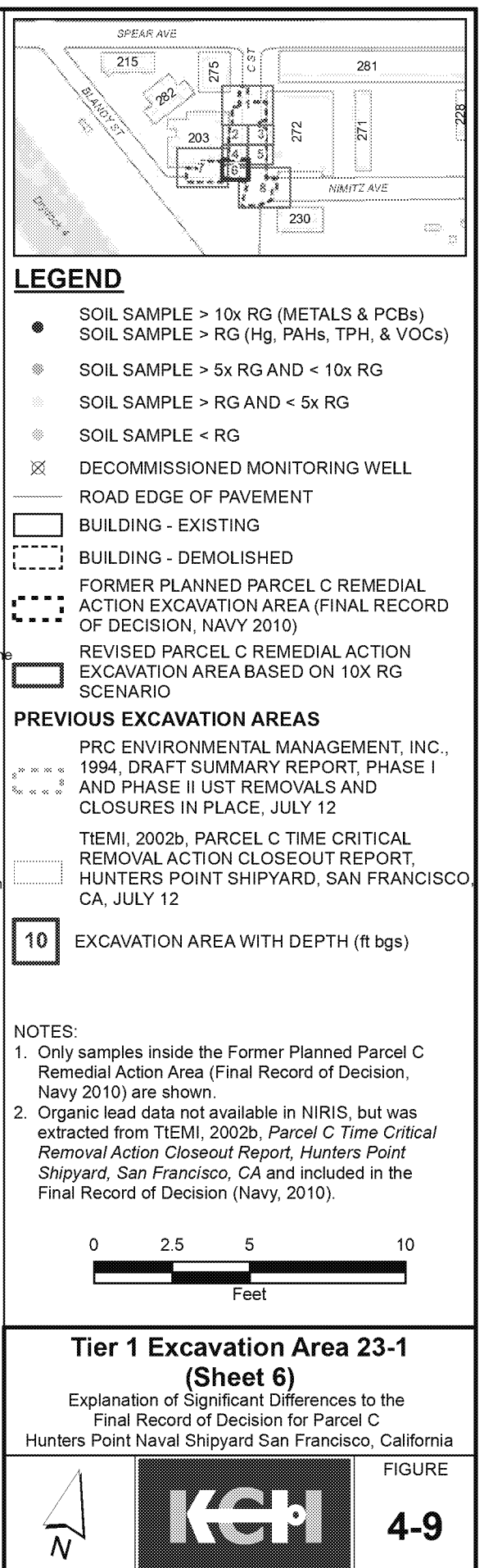
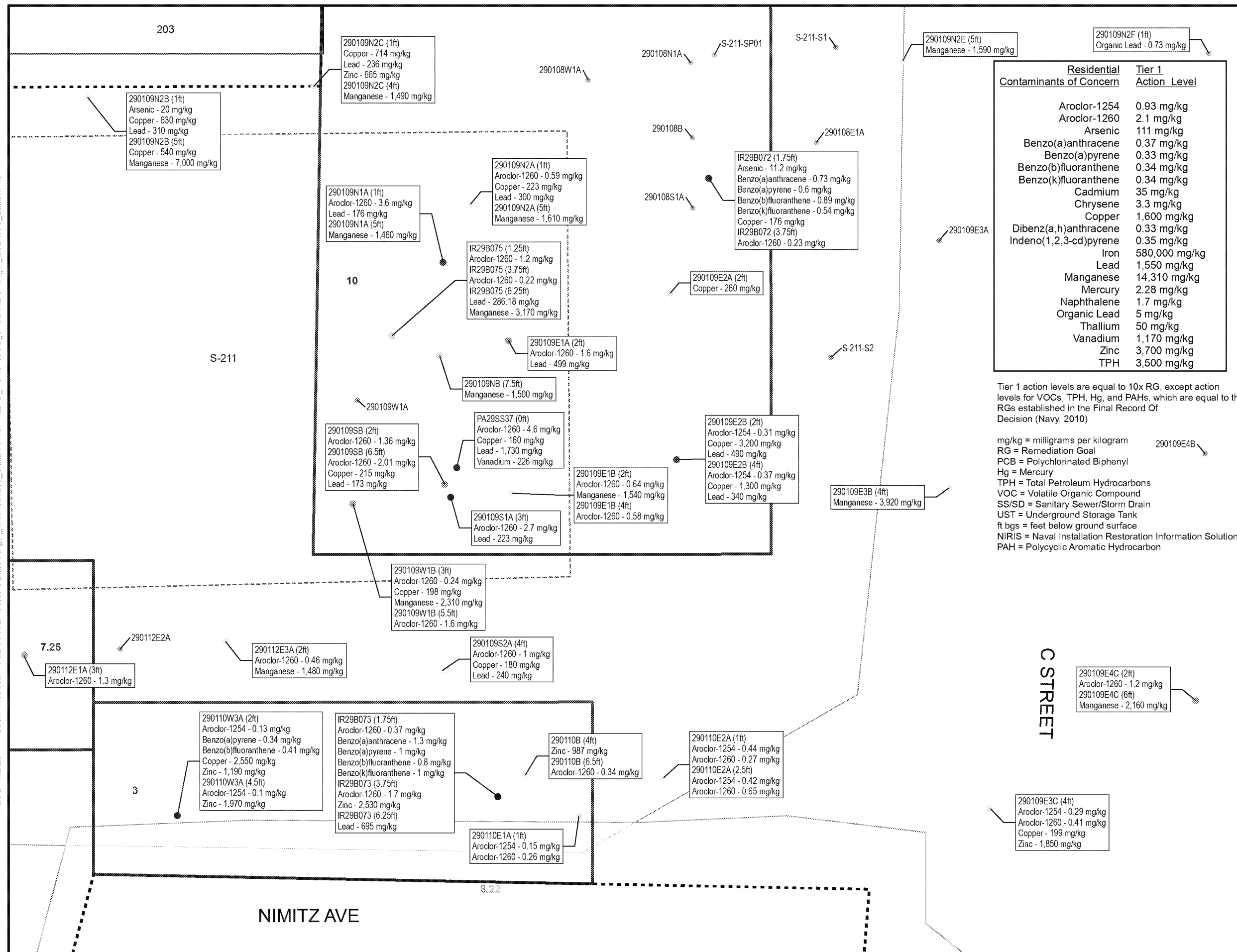
**Tier 1 Excavation Area 23-1 (Sheet 5)**

Explanation of Significant Differences to the Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California

FIGURE 4-8

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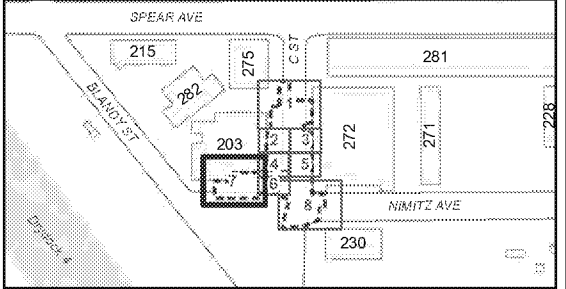
Date: 9/2/2014 User: lmcarsa Path: \\162.168.60.72\drawings\clean\hnters\CONTIGTO\_073MKDPR\_C\_ESEN073\_2226.mxd

Residential Contaminants of Concern	Tier 1 Action Level
Aroclor-1254	0.93 mg/kg
Aroclor-1260	2.1 mg/kg
Arsenic	111 mg/kg
Benzo(a)anthracene	0.37 mg/kg
Benzo(a)pyrene	0.33 mg/kg
Benzo(b)fluoranthene	0.34 mg/kg
Benzo(k)fluoranthene	0.34 mg/kg
Cadmium	35 mg/kg
Chrysene	3.3 mg/kg
Copper	1,600 mg/kg
Dibenz(a,h)anthracene	0.33 mg/kg
Indeno(1,2,3-cd)pyrene	0.35 mg/kg
Iron	580,000 mg/kg
Lead	1,550 mg/kg
Manganese	14,310 mg/kg
Mercury	2.28 mg/kg
Naphthalene	1.7 mg/kg
Organic Lead	5 mg/kg
Thallium	50 mg/kg
Vanadium	1,170 mg/kg
Zinc	3,700 mg/kg
TPH	3,500 mg/kg

Tier 1 action levels are equal to 10x RG, except action levels for VOCs, TPH, Hg, and PAHs, which are equal to the RGs established in the Final Record Of Decision (Navy, 2010)

mg/kg = milligrams per kilogram  
RG = Remediation Goal  
PCB = Polychlorinated Biphenyl  
Hg = Mercury  
TPH = Total Petroleum Hydrocarbons  
VOC = Volatile Organic Compound  
SS/SD = Sanitary Sewer/Storm Drain  
UST = Underground Storage Tank  
ft bgs = feet below ground surface  
NIRIS = Naval Installation Restoration Information Solution  
PAH = Polycyclic Aromatic Hydrocarbon

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LEGEND

- SOIL SAMPLE > 10x RG (METALS & PCBs)
- SOIL SAMPLE > RG (Hg, PAHs, TPH, & VOCs)
- SOIL SAMPLE > 5x RG AND < 10x RG
- SOIL SAMPLE > RG AND < 5x RG
- SOIL SAMPLE < RG
- ⊗ DECOMMISSIONED MONITORING WELL
- ⊙ MONITORING WELL
- ROAD EDGE OF PAVEMENT
- ▭ BUILDING - EXISTING
- ▭ BUILDING - DEMOLISHED
- ▭ FORMER PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA (FINAL RECORD OF DECISION, NAVY 2010)
- ▭ REVISED PARCEL C REMEDIAL ACTION EXCAVATION AREA BASED ON 10X RG SCENARIO

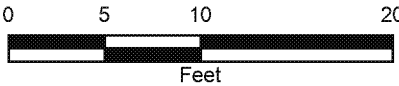
PREVIOUS EXCAVATION AREAS

PRC ENVIRONMENTAL MANAGEMENT, INC., 1994, DRAFT SUMMARY REPORT, PHASE I AND PHASE II UST REMOVALS AND CLOSURES IN PLACE, JULY 12

TtEMI, 2002b, PARCEL C TIME CRITICAL REMOVAL ACTION CLOSEOUT REPORT, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CA, JULY 12

10 EXCAVATION AREA WITH DEPTH (ft bgs)

- NOTES:
- Only samples inside the Former Planned Parcel C Remedial Action Area (Final Record of Decision, Navy 2010) are shown.
  - Organic lead data not available in NIRIS, but was extracted from TtEMI, 2002b, *Parcel C Time Critical Removal Action Closeout Report, Hunters Point Shipyard, San Francisco, CA* and included in the Final Record of Decision (Navy, 2010).

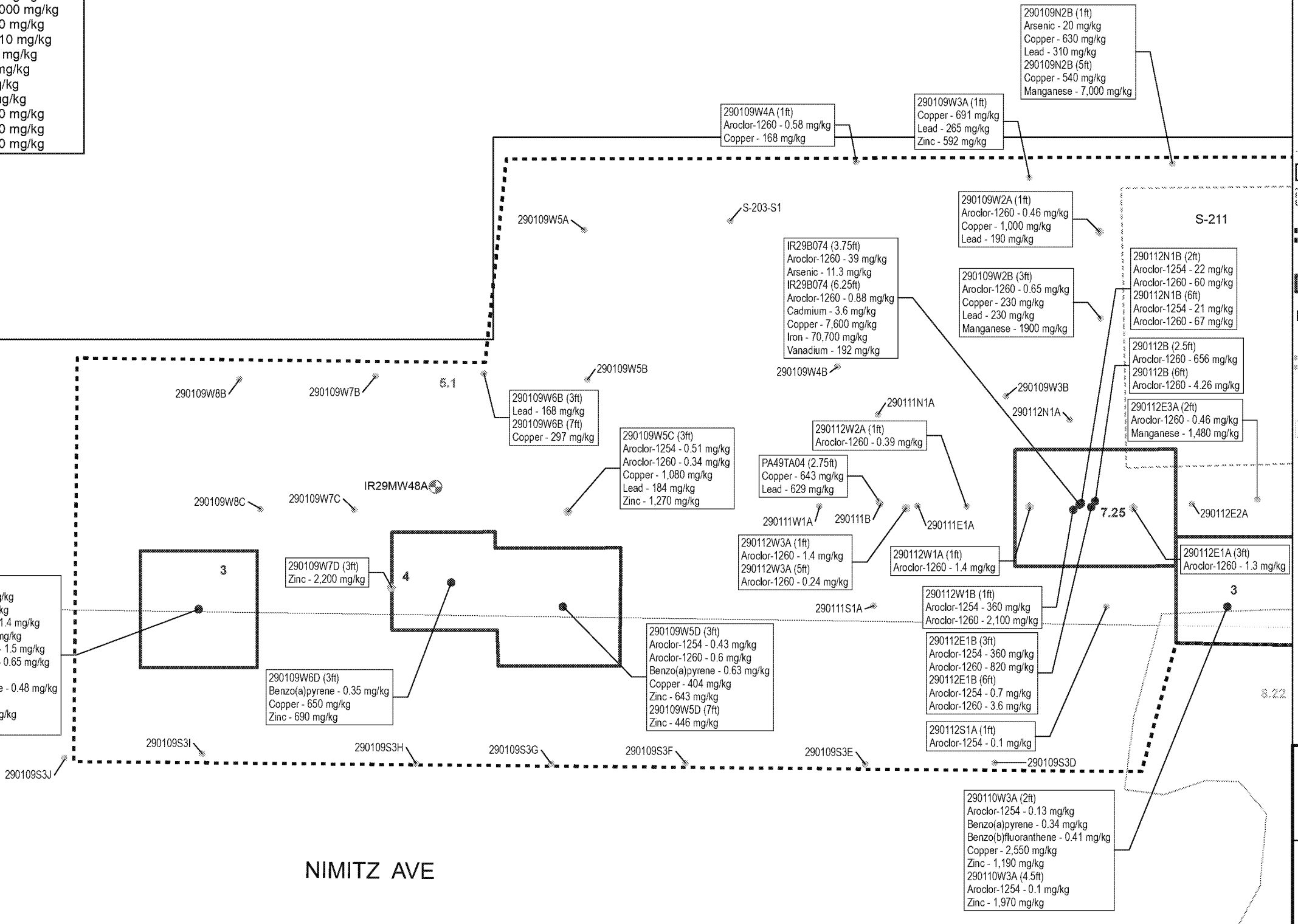


Tier 1 Excavation Area 23-1 (Sheet 7)

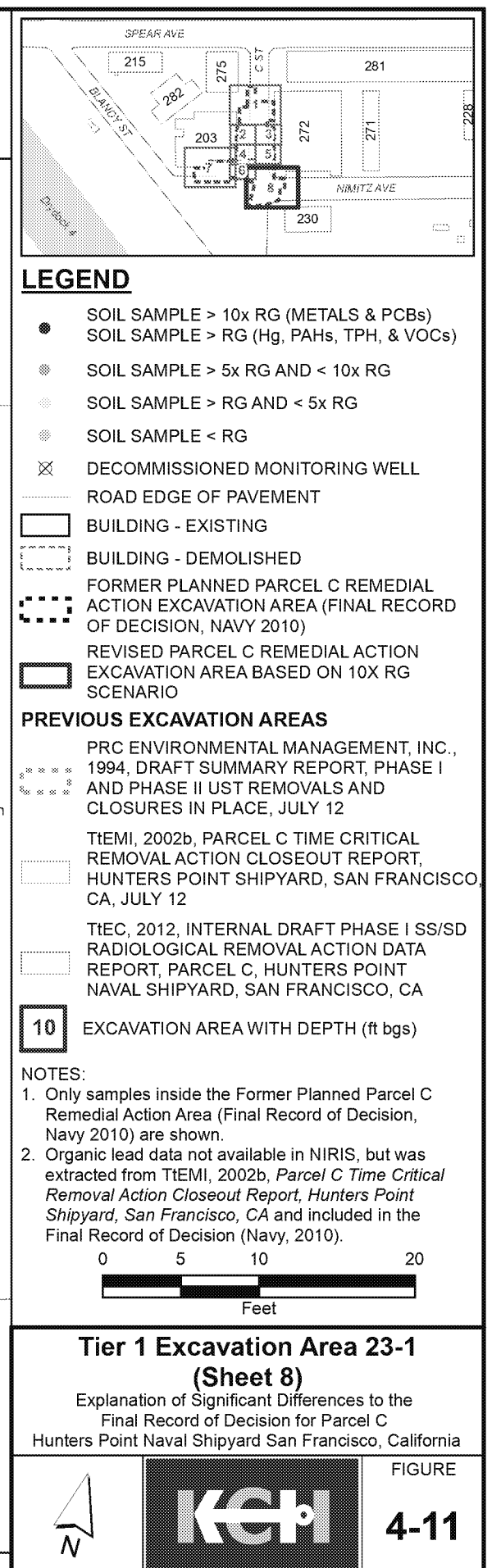
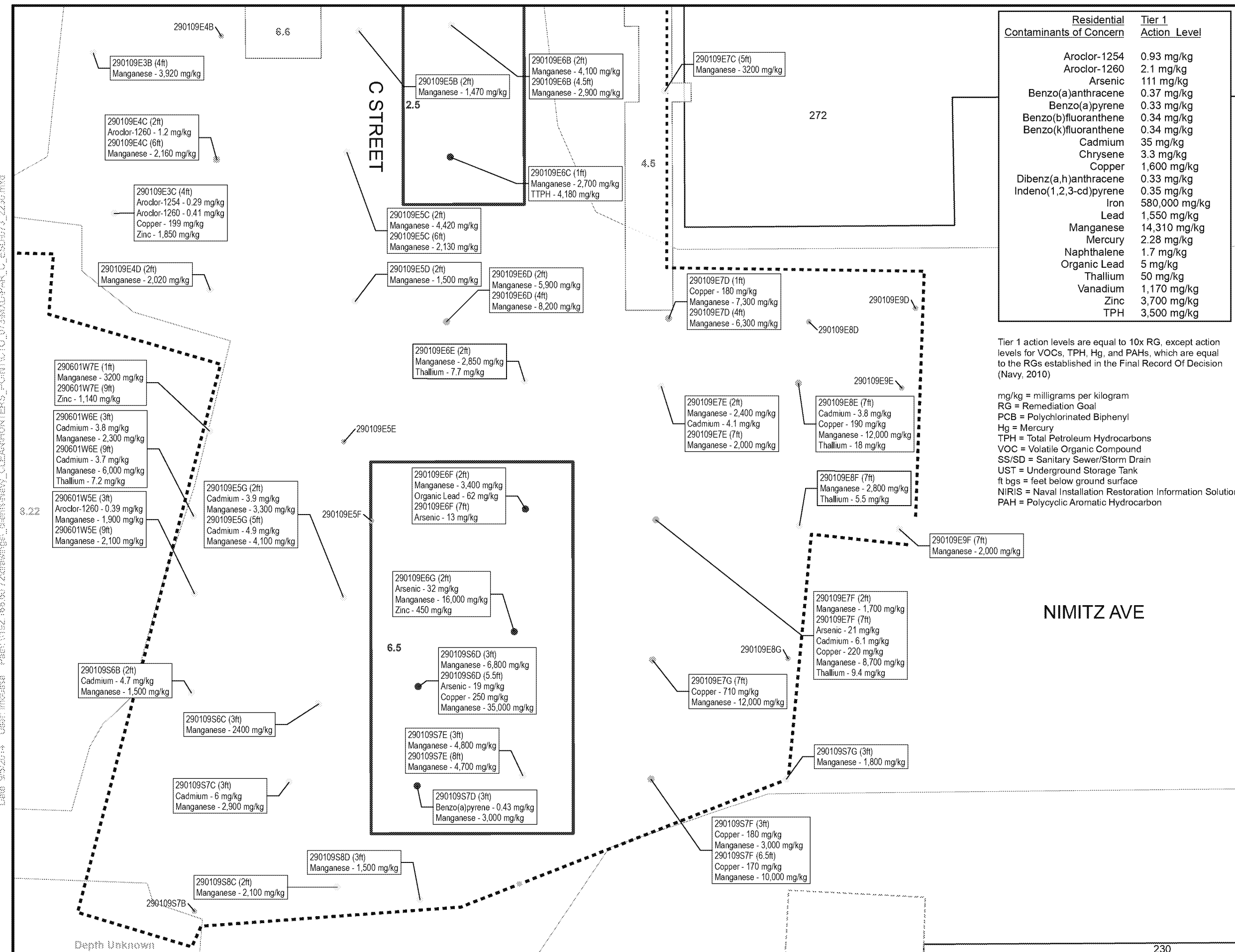
Explanation of Significant Differences to the Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California



FIGURE 4-10

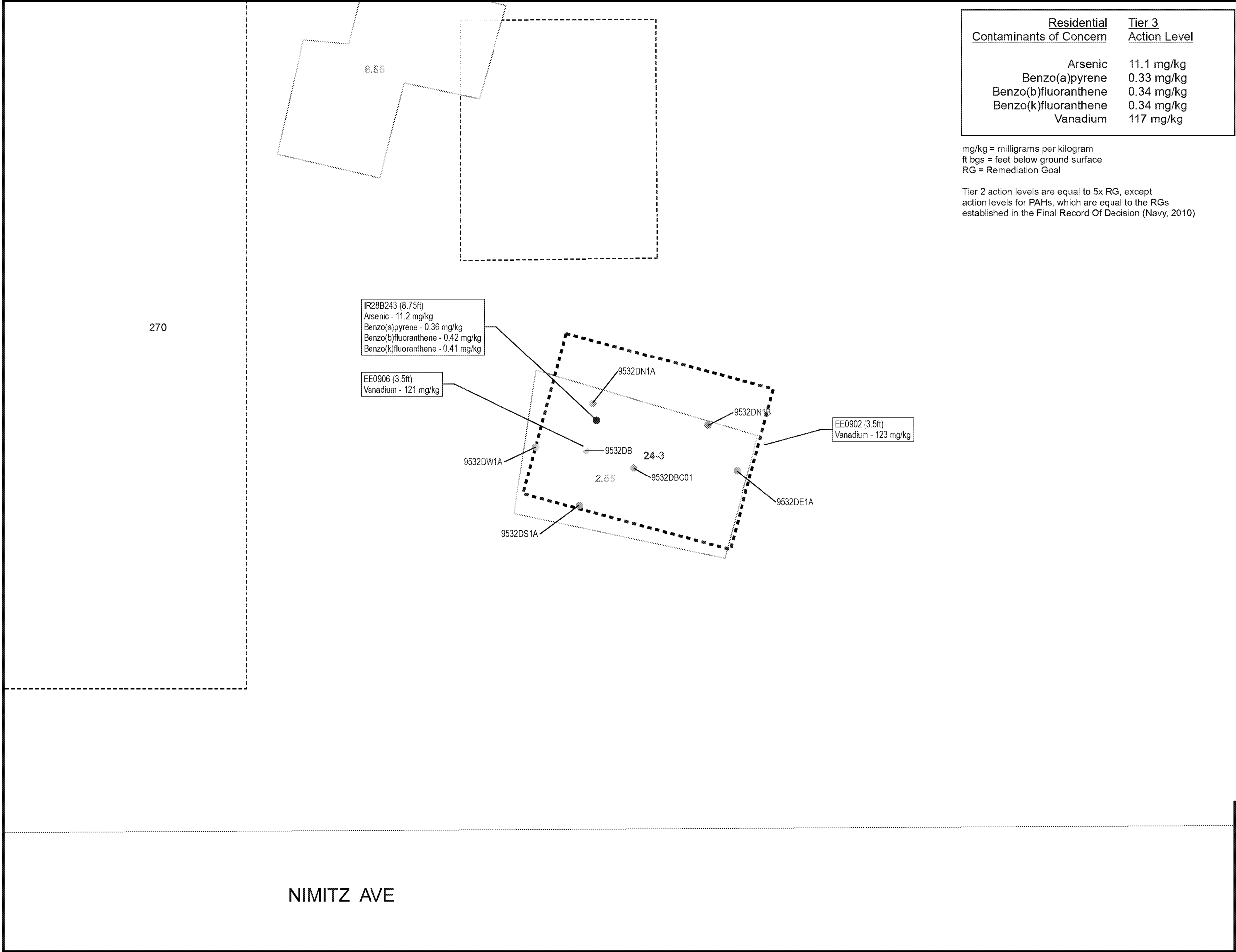


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Residential Contaminants of Concern	Tier 3 Action Level
Arsenic	11.1 mg/kg
Benzo(a)pyrene	0.33 mg/kg
Benzo(b)fluoranthene	0.34 mg/kg
Benzo(k)fluoranthene	0.34 mg/kg
Vanadium	117 mg/kg

mg/kg = milligrams per kilogram  
ft bgs = feet below ground surface  
RG = Remediation Goal

Tier 2 action levels are equal to 5x RG, except action levels for PAHs, which are equal to the RGs established in the Final Record Of Decision (Navy, 2010)

**LEGEND**

- SOIL SAMPLE > 5x RG (METALS)  
SOIL SAMPLE > RG (PAHs)
- ⬢ SOIL SAMPLE > RG AND < 5x RG
- ⬢ SOIL SAMPLE < RG
- ⬢ FORMER PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA (FINAL RECORD OF DECISION, NAVY 2010)
- ⬢ BUILDING - DEMOLISHED

**PREVIOUS EXCAVATION AREAS**

- IT CORPORATION, 1999, DRAFT COMPLETION REPORT, HUNTERS POINT SHIPYARD, EXPLORATORY EXCAVATIONS, SAN RANCISCO, CA, JULY
- TIEMI, 2002b, PARCEL C TIME CRITICAL REMOVAL ACTION CLOSEOUT REPORT, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CA, JULY 12

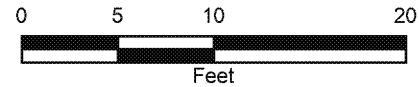
**10** EXCAVATION AREA WITH DEPTH (ft bgs)

**SAMPLE NOTE:**

1. Metals concentrations in soil samples were less than 5x the RG and the area was previously excavated. Therefore, location will not be excavated


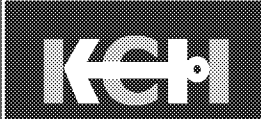
**NOTES:**

1. Only samples inside Former Planned Parcel C Excavation Area (Final Record of Decision Navy, 2010) are shown.



**Excavation Area 24-3**

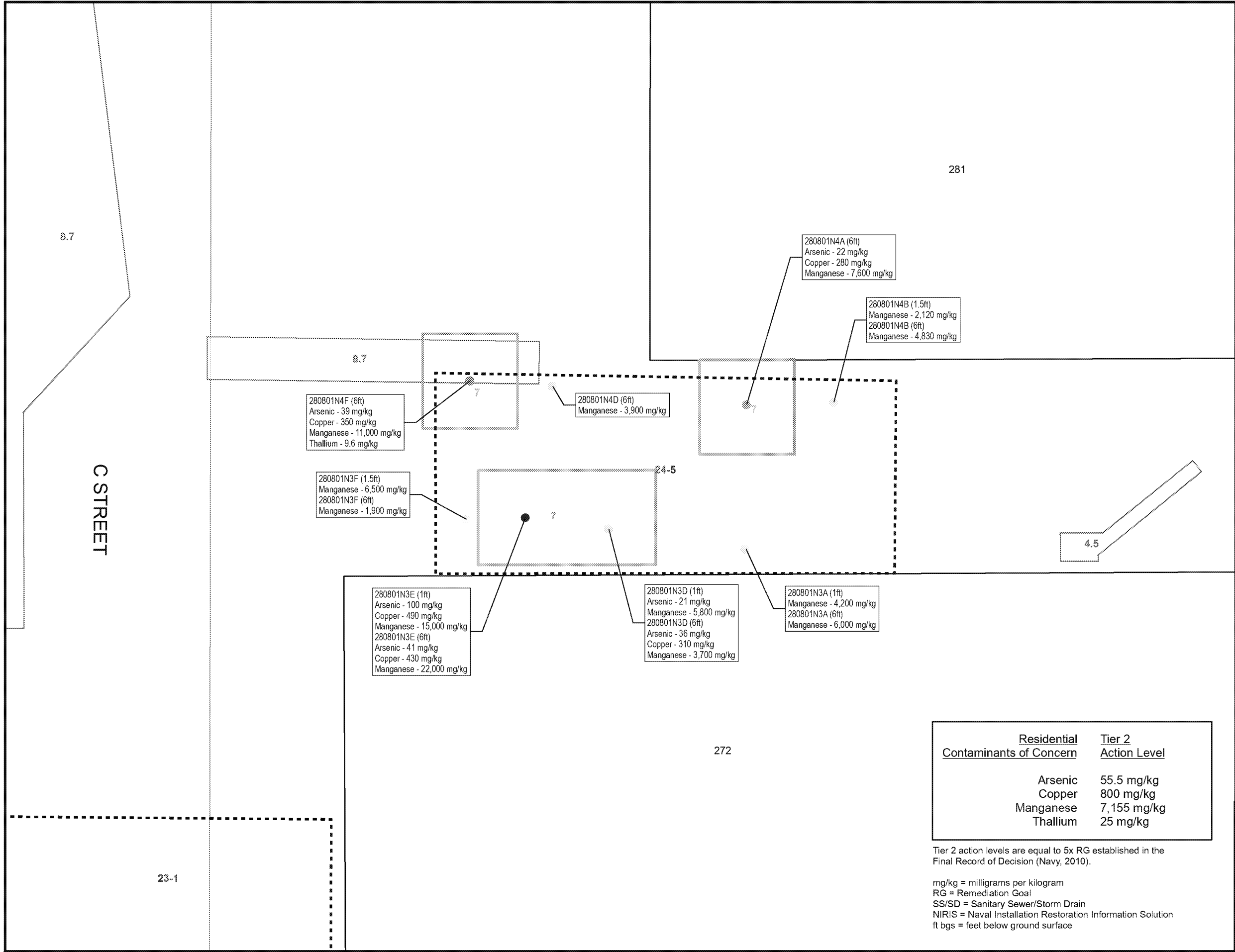
Explanation of Significant Differences to the Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California

  **FIGURE 4-12**

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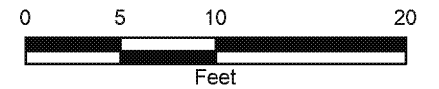
Date: 3/27/2014 User: dbeiger Path: N:\92\_168\80\_72\data\figs\clean\Navy\_CLEAN\Hunters\_Point\CTO\_073M\XDPAR\_C\_ESD073\_2231.mxd



### LEGEND

- SOIL SAMPLE > 10X RG
- ◆ SOIL SAMPLE > 5X RG AND < 10X RG
- ◊ SOIL SAMPLE > RG AND < 5X RG
- FORMER PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA (FINAL RECORD OF DECISION, NAVY 2010)
- REVISED PARCEL C REMEDIAL ACTION EXCAVATION AREA BASED ON 5X RG SCENARIO
- ▭ BUILDING - EXISTING
- PREVIOUS EXCAVATION AREAS**
  - PRC ENVIRONMENTAL MANAGEMENT, INC., 1994, DRAFT SUMMARY REPORT, PHASE I AND PHASE II UST REMOVALS AND CLOSURES IN PLACE, JULY 12
  - TTEC, 2012, INTERNAL DRAFT PHASE I SS/SD RADIOLOGICAL REMOVAL ACTION DATA REPORT, PARCEL C, HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CA
- 10** EXCAVATION AREA WITH DEPTH (ft bgs)

NOTES:  
1. Only samples inside Former Planned Parcel C Excavation Area (Final Record of Decision Navy, 2010) are shown.



### Tier 2 Excavation Area 24-5

Explanation of Significant Differences to the Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California

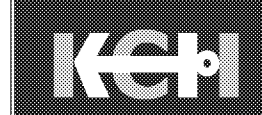


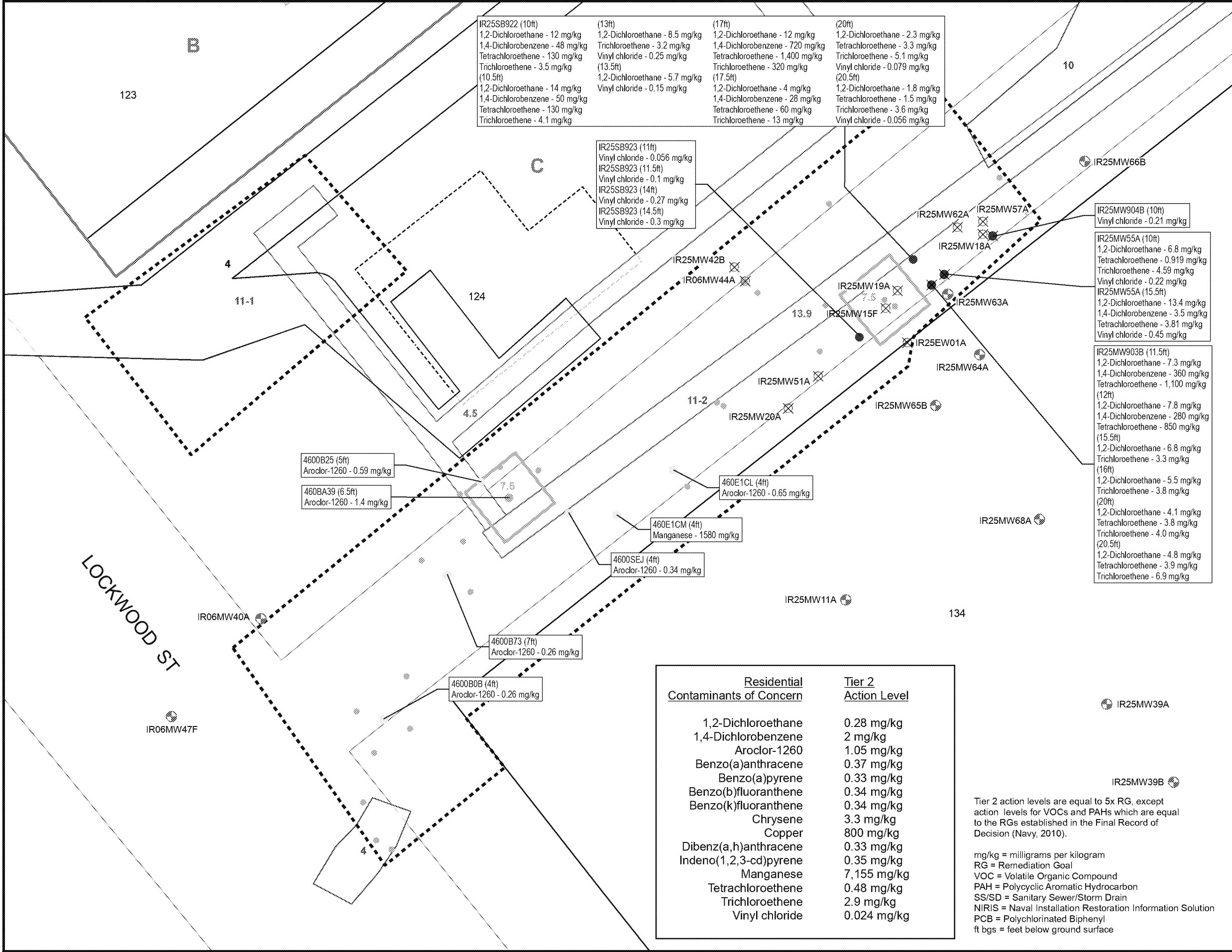
FIGURE  
**4-13**

Residential Contaminants of Concern	Tier 2 Action Level
Arsenic	55.5 mg/kg
Copper	800 mg/kg
Manganese	7,155 mg/kg
Thallium	25 mg/kg

Tier 2 action levels are equal to 5x RG established in the Final Record of Decision (Navy, 2010).

mg/kg = milligrams per kilogram  
RG = Remediation Goal  
SS/SD = Sanitary Sewer/Storm Drain  
NIRIS = Naval Installation Restoration Information Solution  
ft bgs = feet below ground surface

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LEGEND

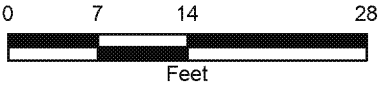
- SOIL SAMPLE > 10x RG (METALS & PCBs)
- SOIL SAMPLE > RG (PAHs & VOCs)
- SOIL SAMPLE > 5x RG AND < 10x RG
- SOIL SAMPLE > RG AND < 5x RG
- SOIL SAMPLE < RG
- DECOMMISSIONED MONITORING WELL
- PLANNED PARCEL C REMEDIAL ACTION EXCAVATION AREA (FINAL RECORD OF DECISION, NAVY 2010)
- REVISED PARCEL C REMEDIAL ACTION EXCAVATION AREA BASED ON 5X RG SCENARIO
- ROAD EDGE OF PAVEMENT
- BUILDING - EXISTING
- BUILDING - DEMOLISHED
- PARCEL BOUNDARY

PREVIOUS EXCAVATION AREAS

- IT CORPORATION, 1999, REMEDIAL ACTION WORK PLAN, PARCEL B, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CA, REV. 9, JULY
- SULTECH, 2004, DRAFT PARCEL B CONSTRUCTION SUMMARY REPORT ADDENDUM, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CA, SEPTEMBER 8
- TTEC, 2012, INTERNAL DRAFT PHASE I SS/SD RADIOLOGICAL REMOVAL ACTION DATA REPORT, PARCEL C, HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CA

10 EXCAVATION AREA WITH DEPTH (ft bgs)

NOTES:  
1. Only samples inside Former Planned Parcel C Excavation Area (Final Record of Decision Navy, 2010) are shown.



Tier 2 Excavation Area 11-2

Explanation of Significant Differences to the Final Record of Decision for Parcel C  
Hunters Point Naval Shipyard San Francisco, California



FIGURE

4-14

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## **Appendix A**

# **Response to Comments on Draft Explanation of Significant Differences**

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**RESPONSE TO COMMENTS ON  
DRAFT EXPLANATION OF SIGNIFICANT DIFFERENCES TO THE  
FINAL RECORD OF DECISION FOR PARCEL C, HUNTERS POINT NAVAL  
SHIPYARD, SAN FRANCISCO, CALIFORNIA**

Comments from:  
Ryan Miya – DTSC, May 6, 2014

Comment Number	Section/ Page	Comment	Response
1.	<b>Section 2.2.1 – Site Risks for Soil.</b>	<p>(a) Given that the previous section 2.2 states that “limited viable habitat is available for terrestrial wildlife at Parcel C because most of the site is covered with pavement”, it is unclear why “root uptake” is listed as a primary fate and transport mechanism in the text. Please either further explain the basis for this mechanism’s inclusion or consider removal from the presented text.</p> <p>(b) Third paragraph. The text presents a summary of the revised Human Health Risk Assessment results for soil. Please consider adding a figure to the document that identifies the locations of the redevelopment blocks discussed and reference this figure in the text accordingly.</p>	<p>(a) Root uptake is indicated as a transport mechanism in Section 2.2.1 because ingestion of homegrown produce by residential receptors was evaluated as a potential exposure pathway in the human health risk assessment (HHRA). Although a durable protective cover will be placed on Parcel C, this pathway was included in the HHRA to address potential future exposures. Because this section of the Explanation of Significant Differences (ESD) summarizes the site risks for soil as presented in the Record of Decision (ROD), root uptake will be left in Section 2.2.1 as one of the transport mechanisms included to estimate site risks (e.g., ingestion or dermal contact).</p> <p>(b) A sentence was added to the third paragraph of Section 2.2.1 to reference Redevelopment Blocks shown in Figure 2-2.</p>
2.	<b>Section 4.2.1 – RU-C1. Soil Excavation 22-2 subsection.</b>	<p>While the text in the first paragraph indicates that the boundaries of excavation area 22-2 were “revised” based on applying the tiered approach, subsequent text in the subsection states that this excavation area will not be included in the RA. Please clarify that soil excavation will no longer be taking place at the previously identified excavation area 22-2 location. In addition, the text should also be modified to clarify that the only soil sample that currently exists exceeding the organic lead remediation goal exists beneath an existing building foundation. Finally, the corresponding Figure 4-2 presenting the Revised Excavation Areas should be revised to accurately reflect that excavation in this area will no longer take place. Please consider removal of excavation area 22-2 from the figure.</p>	<p>Figure 4-2 will be revised to remove excavation area 22-2. The introductory text of Section 4.2.1 has been revised to read “Planned excavation 22-2 will not be included in the RA based on applying the tiered approach (Figure 4-3).”</p> <p>The second sentence under the subheading “Excavation 22-2” has also been edited to read, “Only one sample (IR27GB01) located adjacent to the building foundation (Building 205) at 4.5 feet bgs had an organic lead concentration of 0.93 milligrams per kilogram (mg/kg).”</p>

**RESPONSE TO COMMENTS ON  
DRAFT EXPLANATION OF SIGNIFICANT DIFFERENCES TO THE  
FINAL RECORD OF DECISION FOR PARCEL C, HUNTERS POINT NAVAL  
SHIPYARD, SAN FRANCISCO, CALIFORNIA**

Comments from:  
Ryan Miya – DTSC, May 6, 2014

Comment Number	Section/ Page	Comment	Response
3.	<b>Section 4.2.2 – RU-C4.</b>	(a) Soil Excavation 23-1 subsection. The text states that the areas identified in Figures 4-4 through 4-11 are proposed to be excavated to a minimum of 1 foot deeper than samples exceeding Tier 1 action levels. However, on Figure 4-10, sample number 290109W6D has a Tier 1 action level exceedance for both benzo(a)pyrene and copper at 3 feet below ground surface, and is not included in an excavation area. The adjacent excavation to 4 feet below ground surface should be expanded to include this location accordingly.	(a) Sample number 290109W6D does show an elevated level of benzo(a)pyrene of 0.35 mg/kg compared to a Tier 1 action level of 0.33 mg/kg. However, copper at 650 mg/kg is less than the Tier 1 action level of 1,600 mg/kg. Excavation area 4 will be expanded to include sample number 290109W6D for benzo(a)pyrene (Figure 4-10).
		(b) Soil Excavation 24-3 subsection. The figure presenting the Revised Excavation Areas (Figure 4-2) should be revised to accurately reflect that excavation in this area will no longer take place. Please consider removal of excavation area 24-3 from the figure.	(b) Figure 4-2 will be edited to remove Excavation Area 24-3. Additionally, an introductory sentence will be added to Section 4.2.2 clarifying that Excavation Area 24-3 will not be included in the Remedial Action.
4.	<b>Section 4.2.3 – RU-C5. Soil Excavation 11-2 subsection. Last paragraph.</b>	The text states that a second 10-foot by 10-foot area will be excavated to 3.5 feet below ground surface (bgs), but the corresponding Figure 4-14 has this area labeled as a 7.5 feet bgs excavation. Please correct the text / figure accordingly.	The last sentence of Section 4.2.3 has been edited to say 7.5 feet bgs instead of 3.5 feet bgs.
5.	<b>Section 4.3.2 – Evaluation of Remedy Change for Parcel C.</b>	The evaluation provided must be expanded to include a description of [1] the technical basis used to determine if the post-ROD remedy changes presented herein are non-significant or minor, significant, or fundamental, as well as [2] the administrative process requirements (including the current ESD documentation and public participation) for these post-ROD remedy changes.	<p>The following text has been added to Section 4.3.2 to describe the technical basis for a non-significant or minor change and to describe the administrative process requirements:</p> <p>“Type of Change</p> <p>Based on this evaluation, the Navy considers these changes to be significant. The tiered approach results in scope reduction and cost minimization but does not fundamentally alter the overall cleanup approach of excavation and protective cover. The protective cover ensures the contaminant pathway is broken and the tiered approach does not result in an unacceptable risk.</p> <p>Administrative Process Requirements</p> <p>A notice of availability and a brief description of the ESD will be published in a local newspaper and a copy of the ESD will be provided in the Hunters Point repository and local libraries.”</p>



**RESPONSE TO COMMENTS ON  
DRAFT EXPLANATION OF SIGNIFICANT DIFFERENCES TO THE  
FINAL RECORD OF DECISION FOR PARCEL C, HUNTERS POINT NAVAL  
SHIPYARD, SAN FRANCISCO, CALIFORNIA**

Comments from:

Tina Low, P.E. - Groundwater Protection Division – WQCB, San Francisco Bay, May 14, 2014

Comment Number	Section/ Page	Comment	Response
1.	<b>Section 2</b>	This section states that the Final ROD identified 31 excavation areas, while Section 2.4.1 (page 2-4) states excavations were planned at 32 areas in Parcel C. Please revise the text as needed for consistency.	The introductory paragraph of Section 2 has been corrected to identify 31 excavation areas.
2.	<b>Section 2</b>	Please clarify whether the tiered approach was applied to all 31 (or 32) excavations or only a subset.	<p>The tiered approach was not performed on all of the excavation areas. During working and Base Realignment and Closure Cleanup Team (BCT) meetings, the BCT agreed that some of the areas with high concentrations of volatile organic compounds (VOCs) should not be reduced or evaluated for the tiered approach. Only the areas with non-migratory contaminants of concern (COCs) such as metals and low polychlorinated biphenyls (PCBs) were evaluated with the tiered approach since durable covers would be an appropriate remedy.</p> <p>The last sentence of Section 2.0 was edited to read: "This ESD presents changes to some excavation boundaries resulting from a tiered approach where soil exceeding the RGs are left in place for metals (excluding mercury) and polychlorinated biphenyls based on the results of a screening level HHRA which shows these locations are within the acceptable risk range and/or are statistically similar to background. The screening level HHRA was originally performed on eight of the 31 excavations but only four excavations met the criteria for reduction."</p>
3.	<b>Section 3</b>	Please provide the rationale for selecting the excavations where the tiered approach was applied.	<p>Section 4.1.1 goes into greater detail on the selection of excavations for the tiered approach. To clarify the intent of the ESD, Sections 1.0 and 3.0 were revised to include additional rationale on why this approach was applied.</p> <p>Metals and PCBs were chosen for the tiered approach because these COCs do not migrate in soil and can be successfully contained under a durable cover. Metals that are ubiquitously encountered at Hunters Point (e.g., manganese) are often above remedial goals (RGs) and are associated with the basement rock underlying the surface fill and the fill itself. (Tetra Tech EMI, Inc., 2001)</p>

**RESPONSE TO COMMENTS ON  
DRAFT EXPLANATION OF SIGNIFICANT DIFFERENCES TO THE  
FINAL RECORD OF DECISION FOR PARCEL C, HUNTERS POINT NAVAL  
SHIPYARD, SAN FRANCISCO, CALIFORNIA**

Comments from:

Tina Low, P.E. - Groundwater Protection Division – WQCB, San Francisco Bay, May 14, 2014

Comment Number	Section/ Page	Comment	Response
4.	<b>Section 4</b>	In the last sentence of the second paragraph, we suggest deleting “minimal”, as the proposed excavation areas and depths result in significant changes to the excavation volume.	This sentence has been edited to delete the word “minimal.”
5.	<b>Section 4</b>	The bulleted sections should be revised to clearly state which excavation areas have modified area boundaries, excavation depths, or were removed. The excavation areas listed under “No changes are proposed for the following areas...” should only include those excavation areas where no changes in area, depth, or volume are proposed.	Section 4.0 was revised to clearly show excavation areas that were removed, modified, or had no changes.
6.	<b>Section 4.1.1</b>	Please revise the text to list the specific ubiquitous metals and organic chemicals. Also, the RGs described in the ROD already considered the ubiquitous nature of the metals; the Hunters Point Ambient Levels (HPALs) were the basis for the RGs. Therefore, please expand the technical justification for why a tiered approach for ubiquitous metals is appropriate given the RGs already take into account levels of metals naturally occurring in the fill material.	<p>The last paragraph of Section 4.1.1 refers to Table 4-1, which lists the COCs for each site, respective ROD RGs, and respective action levels based on the RGs and identified tier for the site. As indicated in Section 4.1.1, the tiered approach was applied to metals (excluding mercury) and PCBs only. The last paragraph of Section 4.1.1 was revised to explain that the specific ubiquitous metals and PCBs that are addressed using the tiered approach are shown in Table 4-1; boldface type in Table 4-1 indicates the COCs (metals and PCBs) for which the RG and action level differ as a result of applying the tiered approach. The following paragraph was added to Section 3.0 to provide additional technical justification:</p> <p>“A revised screening-level HHRA was performed to determine if leaving soil with concentrations exceeding the RGs for ubiquitous metals and organic chemicals in place would still be protective of human health. Based on the screening-level HHRA results, the tiered approach was applied to specific excavations where higher concentrations of select metals and organic chemicals existed (at 5x and 10x the RGs), and it was concluded that the recommended modifications to the remediation strategy would still be within the acceptable risk range and below a hazard index of 1. The tiered approach remains protective of human health by reducing risk to within the risk range (defined as 1E-4 to 1E-6 as discussed in the NCP [USEPA, 1994]) and/or reducing</p>

**RESPONSE TO COMMENTS ON  
DRAFT EXPLANATION OF SIGNIFICANT DIFFERENCES TO THE  
FINAL RECORD OF DECISION FOR PARCEL C, HUNTERS POINT NAVAL  
SHIPYARD, SAN FRANCISCO, CALIFORNIA**

Comments from:

Tina Low, P.E. - Groundwater Protection Division – WQCB, San Francisco Bay, May 14, 2014

Comment Number	Section/ Page	Comment	Response
6. (continued)			the hazard to below 1. Further, the implementation of the tiered approach does not change the soil RAOs as the revised approach still prevents or minimizes exposure to chemicals at concentrations above the revised RGs at these locations.” In the FS, the RGs for metals are based either on the HPAL or risk based concentrations (RBCs). Most of the RBCs are based on the risk in the conveyance agreement, which is $10^{-6}$ . However, with the remedy of a parcel-wide cap, the BCT determined that attaining the conservative risk of $10^{-6}$ was not necessary but attaining the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) risk range of $10^{-4}$ to $10^{-6}$ would suffice as long as the COCs were not contributing to indoor air vapor intrusion or migration of contaminated groundwater into the Bay. A parcel wide cap would allow some low-level contamination to stay in place as long as the screening level risk assessment showed that the risk range is between -4 to -6, this can be done with 5 or 10 times above a conservative RG.
7.	<b>Section 4.1.1</b>	The last sentence of the first paragraph states, “Rather than excavate all soils containing ubiquitous metals above RGs and all organics with isolated concentrations above RGs, excavation focused on removing higher concentrations of COCs [following a tiered approach].” Since the “isolated” nature of the concentrations above RGs is part of the rationale for implementing a tiered approach, please clarify how the concentrations were determined to be isolated. Were samples taken near the “isolated” locations? If not, how can it be assured that the sample concentrations are not actually representative?	The isolated nature of contaminants was determined through a review of existing data. Some sample points showed high concentrations but were surrounded by sampling points with much lower concentrations. A sentence of explanation has been added to Section 4.1.1 which reads “Isolated locations were identified through a review of existing sample data to determine if there were high concentration locations generally surrounded by lower or risk-based tiered concentrations.”
8.	<b>Section 4.1.1</b>	The first sentence of the second paragraph states, “It should be noted that Tier 1 locations (greater than ten times the RG) by definition also include Tier 2 locations (greater than five times the RG).” Please correct to state that Tier 2 locations by definition also include Tier 1 locations.	A Tier 1 location at greater than 10 times the RG would also include Tier 2 that is 5 times the RG. However, a Tier 2 location at greater than 5 times the RG may not also include a location that is 10 times the RG.

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DRAFT EXPLANATION OF SIGNIFICANT DIFFERENCES TO THE  
FINAL RECORD OF DECISION FOR PARCEL C, HUNTERS POINT NAVAL  
SHIPYARD, SAN FRANCISCO, CALIFORNIA**

Comments from:

Tina Low, P.E. - Groundwater Protection Division – WQCB, San Francisco Bay, May 14, 2014

Comment Number	Section/ Page	Comment	Response
9.	Section 4.1.1	The first sentence of the third paragraph states that the tiered approach was applied to PCBs, which are neither ubiquitous nor sourced from the local rock. Please revise the text to provide the rationale for including PCBs in the tiered approach.	<p>The BCT and the Navy discussed and agreed to include metals (excluding mercury) and PCBs in the tiered approach during three separate TRIAD meetings held during the period from September 2012 through March 2013. In addition, comments from the BCT were provided and addressed in a response-to-comments document included in the <i>Final Technical Memorandum Soil Excavations, Parcel C Remedial Action, Remedial Units C1, C2, C4, and C5, and Building 241, Hunters Point Naval Shipyard, San Francisco, California</i> issued in August 2013. (Shaw 2013)</p> <p>The selection of COCs included in the tiered approach was an iterative process but was ultimately based on the results of a separate screening-level HHRA. Only COCs determined to be within the acceptable risk management range were included. The tiered approach was determined to be acceptable in the cases of four excavations; however, only two of those excavations (Excavation Areas 11-2 and 23-1) included PCBs (Aroclors 1254 and 1260). Because of the immobile nature of PCBs, the BCT agreed that the durable cover would serve as a remedy to prevent exposure to humans and the environment as long as the risk assessment showed no risk to the construction worker.</p> <p>The tiered approach remains protective of human health by reducing risk to within the risk range (defined as 1E-4 to 1E-6 as discussed in the NCP [USEPA, 1994]). Further, the implementation of the tiered approach does not change the soil remedial action objectives (RAOs), because the revised approach still includes the implementation of a protective cover that further prevents or minimizes exposure to chemicals at concentrations above the revised RGs at the screened locations.</p>

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Comments from:

Tina Low, P.E. - Groundwater Protection Division – WQCB, San Francisco Bay, May 14, 2014

Comment Number	Section/ Page	Comment	Response
10.	<b>Section 4.1.1: Screening-Level Human Health Risk Assessment</b>	This section states that a new screening-level HHRA was performed to estimate the residual risks and hazards associated with excavation to Tier 1 and Tier 2 action levels for metals (excluding mercury) and PCBs for several excavation areas, including Excavations 10-3, 10-4, and 24-4. However the second paragraph then states that these three excavations were not considered for a tiered approach. These statements do not seem consistent; please revise the text to clarify.	While eight excavation areas were selected for a screening level HHRA, only four of those locations yielded results where a tiered approach would be consistent with acceptable risks. The remaining three locations will be excavated to 1 foot below the extent of known contamination rather than to 10 feet. The text in this section has been revised for additional clarification.
11.	<b>Section 4.2</b>	Please add text to the first paragraph of this section to explain why some excavation boundaries were changed based on applying Tier 1 action levels, while others were revised based on Tier 2 action levels.	The following sentence was added to Section 4.2: "Estimated residual risks and hazards were compared with the target risk range of 1E-4 to 1E-6 and target hazard threshold of 1.0, as discussed in the NCP (USEPA, 1994) and <i>Risk Assessment Guidance for Superfund (RAGS)</i> , Part A (USEPA, 1989) to determine which risk-based tier should be applied to excavation areas."
12.	<b>Section 4.2, 4.2.2, 4.2.3</b>	Please revise these sections to clarify that post-excavation (confirmation) sampling, as specified in the Final Remedial Action Work Plan (RAWP) and Sampling Analysis Plan (SAP), will determine the final excavation depths.	The following sentence was added to Sections 4.2.2 and 4.2.3: "Confirmation sampling as specified in the Final Remedial Action Work Plan and Sampling Analysis Plan will determine the final excavation depths."
13.	<b>Section 4.2.2 Soil Excavation 24-3</b>	The ESD proposes to remove this excavation area such that no further excavation would take place. However, Figure 4-12 shows PAH concentrations above RGs. Leaving soil with PAH concentrations exceeding RGs is not consistent with the proposed tiered approach. Please revise the text to provide justification for removing this excavation area given then PAH exceedances.	Although residual polycyclic aromatic hydrocarbon (PAHs) are detected at Excavation Area 24-3 at concentrations exceeding RGs, the cumulative residual risk for Excavation Area 24-3 (excluding arsenic and vanadium, for which concentrations are statistically similar to background) does not exceed the risk management range of 1E-04 to 1E-06 and the hazard index (HI) is less than the threshold of 1.  In addition, detections of residual PAHs above the RG were at concentrations slightly exceeding RGs and were limited to one location at area 24-3 (IR28B243, 8.75 feet bgs); residual risks were estimated using residual PAH detections at this location as exposure point concentrations (EPCs), as 95 percent UCL EPC results from USEPA's ProUCL software defaulted to the maximum detected concentration. This approach likely results in an overly conservative estimate of residual risks because it assumes

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Tina Low, P.E. - Groundwater Protection Division – WQCB, San Francisco Bay, May 14, 2014

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			<p>that exposure to PAHs is limited to the maximum detected concentrations for the entire duration of exposure (30 years). Consequently, it was discussed and agreed during three separate TRIAD meetings between September 2013 and March 2013 that Excavation Area 24-3 would be addressed as a No Further Action in the <i>Final Technical Memorandum Soil Excavations, Parcel C Remedial Action, Remedial Units C1, C2, C4, and C5, and Building 241, Hunters Point Naval Shipyard, San Francisco, California</i> issued in August 2013. (Shaw 2013)</p> <p>The No Further Action approach remains protective of human health as it falls within the acceptable risk range (defined as 1E-4 to 1E-6 as discussed in the NCP [USEPA, 1994]). Further, the implementation of the tiered approach does not change the soil RAOs as the revised approach still includes the implementation of a protective cover that further prevents or minimizes exposure to chemicals at concentrations above the revised RGs at the screened locations.</p>

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Comments from:

John Chesnutt – USEPA, Region IX, May 29, 2014

Comment Number	Section/ Page	Comment	Response
<b>General Comments:</b>			
1.		<p>Page 1-1 of the ESD states, "Implementation of these tiered action levels for the excavation portion of the selected soil remedy will not change the RGs as presented in the Final ROD." Table 3 in the ROD identifies specific, numerical RGs. As reflected in the text and Table 4-1, those numbers are changing because they are now being multiplied by either 5 or 10. As EPA mentioned in the March 27 BCT meeting, the ESD should clearly reflect what is actually going on with respect to RGs — they are changing. Otherwise, the record becomes quite confusing.</p> <p>It would be more accurate for the Navy to say that the RGs are being revised in some instances based on a tiered approach, but RAOs remain the same. The ROD identifies soil RAOs as follows:</p> <ul style="list-style-type: none"> <li>• Prevent or minimize exposure to organic and inorganic chemicals in soil at concentrations above remedial goals developed in the HHRA for the following exposure pathways: <ul style="list-style-type: none"> <li>a. Ingestion of, outdoor inhalation of, and dermal exposure to surface and subsurface soil.</li> <li>b. Ingestion of homegrown produce in native soil.</li> </ul> </li> <li>• Prevent or minimize exposure to VOCs in soil gas</li> </ul> <p>The ESD should be clear that the RAOs are not changing as long as the remedy will still prevent or minimize exposure to chemicals at concentrations above the revised RGs.</p>	<p>The Navy acknowledges that the application of tiered action levels for the excavation portion of the selected soil remedy will result in changes to the specific numerical RGs identified in the ROD, and the Navy agrees that the RAOs remain unchanged. Accordingly, Sections 1, 3, and 4 of the ESD have been revised to be consistent with the understanding that applying the tiered approach will result in a change to the RGs, and scope reduction and cost reduction, but no change to the RAOs and no fundamental change to the overall cleanup approach of excavation and protective cover.</p>
2.		<p>The ESD could do a better job of explaining why there needs to be a change in the first place. The ROD guidance provides that an ESD must summarize the information that prompted and supports significant differences from the selected remedy. The only place the ESD explains what prompted it is buried in the middle of section 4.4.1, on p. 4-2: "Removal of ubiquitous metals and organic chemicals in soil at concentrations exceeding RGs could involve excavating very large quantities of soil (i.e., over 40,000 bank cubic yards) from parcel C...Rather than excavate all soils containing ubiquitous metals above RGs and all organics with isolated concentrations above RGs, excavation focused on removing higher concentrations of COCs." It seems this information should go in section 3 (Basis for Significant Differences). The ESD should also</p>	<p>Additional information regarding the basis for the remedy change has been included in the ESD. Section 3.0 was revised to include a description of the rationale for the remedy change and an explanation regarding how the revised approach is protective of human health and meets RAOs (see WQCB comment 3).</p>

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		state more clearly in that same section that the revised approach is still protective of human health (i.e., within the risk range) and achieves RAOs, as indicated in General Comment 1. All this information is scattered throughout the ESD but it is never succinctly stated in one place.	
3.		Section 4.1.1 Tiered Approach, Page 4-3, states, "Although some excavation areas have estimated residual hazards above 1.0, these slightly elevated hazards are a result of ubiquitous metals. Residual concentrations of manganese in Excavation 23-1 and Excavation 24-5, ... , are similar to background." Table 4-2 shows the residual Hazard Index without HPAL COCs for these Excavation Areas as 1.5 and 4.1, respectively. While a value of 1.5 may be considered "slightly elevated" to some based on a manganese level "similar to background", the fact that the HPAL already takes into account the variability of background, it is more difficult to claim that the higher HI of 4.1 is due to background, especially when no site history for this area is provided. While the area may indeed meet the RAO on account of the durable cover, the description of the HI without HPAL COCs needs to be discussed more fully in Sections 4.1.1 and 4.2.2. It needs to be clear that because the HI exceeds 1.0 without background, it could represent a residual site-related risk or possibly an unusually high background outlier, but that it still meets the RAO. However, if this approach does not fit squarely within the scope of the ROD and this ESD, then the Navy may need to consider not using the tiered approach to revise the RGs at Excavation Area 24-5.	<p>Additional clarification has been added to Sections 4.1.1 and 4.2.2 to explain that an HI above 1.0 (from manganese) could represent a localized site hazard but that RAOs would be met.</p> <p>Past studies were conducted on Hunters Point Naval Shipyard and recorded in a document titled, "Evaluation of Ambient Manganese Conditions at Hunters Point Shipyard dated December 21, 2001, and "Metals Concentrations in Franciscan Bedrock Outcrops," dated March 17, 2004. Both of these studies have concluded that the highest concentrations of natural manganese in rocks of coast California are found in chert and basalt contained in the Franciscan Complex. Excavation Areas 23-1 and 24-5 fall within an area where chert interbedded with shale have been mapped or identified. This area according to the two studies has manganese concentrations ranging from 11,000 mg/kg to 30,200 mg/kg.</p> <p>Residual manganese concentrations in Excavation Area 24-5 are generally statistically similar to background (based on background hypothesis testing using USEPA <i>ProUCL Software</i> [2013] Wilcoxon-Mann-Whitney Test p-value = 0.42. Residual manganese concentrations in Excavation Area 23-1 are also generally statistically similar to background (based on background hypothesis testing using USEPA <i>ProUCL Software</i> [2013] Wilcoxon-Mann-Whitney Test p-value = 1.0 and Attachment 2 in the Appendix G Tech Memo [Shaw, 2013]). This slightly elevated hazard is deemed acceptable because the metal responsible for the elevated hazard (manganese) is statistically similar to background.</p>



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4.		The information presented in Section 4.3.2, Evaluation of Remedy Change for Parcel C, lacks sufficient detail. For example, the Cost subsection of Section 4.3.2 state "The ESI revisions to Soil Alternative S-5 will reduce the capital cost by approximately 30 percent because of the reduced volume of excavation;" however, a detailed cost breakdown of ESD revisions to Soil Alternative 5-5 are not provided. Section 7.3.2 of the ROD guidance indicates that the ESD should "provide additional information on changes that have resulted in the remedy as a result of the change (e.g., changes in the cleanup cost estimate or remediation time frame)." Please revise the Draft ESD to provide detailed information on the changes to Soil Alternative S-5 due to the ESD revisions.	The reduction in cost as a result of the tiered approach is due to the reduction in volume of soil excavated. The percentage of cost reduction was estimated linearly from the percent reduction in volume.  Additional clarification was added to Section 4.3.2 stating "The tiered approach will result in an approximate volume reduction of 16,000 cubic yards. The estimated cost for excavation, personnel, soil sampling, backfilling, and soil disposal is approximately \$250 per cubic yard. This equates to a cost reduction of approximately \$4,000,000."
<b>Specific Comments</b>			
1.	<b>Section 1.0, Introduction, Pages 1-1 to 1-2</b>	Section 1.0 does not indicate when the Final ROD was signed. Based on Highlight 7-2, Sample Outline and Checklist for ESDs and ROD Amendments, of the Post-ROD Guidance, the Draft ESD should clarify when the Final ROD was signed. Please revise Section 1.0 to clarify when the Final ROD was signed.	A sentence was added to Section 1.0 to specifically identify that the Final ROD for Parcel C was signed on September 30, 2010.
2.	<b>Section 3.0, Basis for Significant Changes in the Selected Remedy, Page 3-1</b>	Section 3.0 does not indicate whether any information in the Administrative Record file supports the need for the change. Based on Highlight 7-2, Sample Outline and Checklist for ESDs and ROD Amendments, of the Post-ROD Guidance, the Draft ESD should reference any information in the Administrative Record file that supports the need for the change. Please revise Section 3.0 to clarify whether any information in the Administrative Record file supports the need for the change.	A sentence was added to Section 3 referencing the Final Work Plan and associated Technical Memorandum, which supports the need for a change to the Final ROD.

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Comments from:

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3.	<b>Section 4.0, Description of Significant Differences, Page 4-1 and Section 4.2.4, Documentation of Non-Significant Changes, Page 4-6</b>	As currently written, Section 4.0 appears to be inconsistent with Section 4.2.4. Section 4.0 indicates that no changes are proposed for a number of excavations, including “RU-C4 - Soil Excavations 23-2, 23-3, 24-1, 24-2, 24-4, 24-6, 26-1, 26-2, and CMI-1; RU-C5 -Soil Excavations 10-1, 10-2, 10-3, 10-4, 10-5, and 11-1; and Building 241 - Soil Excavations 18-1, 18-2, 18-3, and 18-4.” The text also states that excavations at these areas “will be based on RGs as presented in the Final ROD rather than the tiered approach presented in the Draft ESD.” However, Section 4.2.4, Documentation of Non-Significant Changes, indicates that several areas (Soil Excavations 10-3, 10-4, 11-1, 18-2, 18-4, 24-2, 24-4, and 26-2) were revised to extend one foot vertically from the known extent of contamination rather than 10 feet below ground surface (bgs) as described in the Final ROD, which is inconsistent with the statement that there are “no changes.” Please revise Section 4.0 to clarify that several non-significant changes are proposed for several of the listed excavations as described in Section 4.2.4.	Section 4 has been revised to more specifically place excavation areas into three categories:  1. Significant changes where excavation areas were removed or modified.  2. Non-significant changes where excavation depth was revised to extend 1 foot vertically from the known extent of contamination rather than 10 feet bgs as described in the Final ROD.  3. No changes to excavation. Areas where excavation will be based on RGs as presented in the Final ROD rather than the tiered approach presented in this ESD.
4.	<b>Signature page 7-2</b>	Please change “Mr.” to “Ms.” for Ms. Angeles Herrera.	This change was made to the signature page.
5.	<b>Table 4-1 and related text in the body of the ESD</b>	Consistent with General Comment 1, please change “Action Level” in the right column heading to something like “Revised RGs” or “Revised ROD/ESD RGs”.	Please see the response to General Comment 1.
6.	<b>Figure 4-10, Tier I Excavation Area 23-1 (Sheet 7)</b>	Location 290109W6D is denoted with a red dot, indicating that the soil sample collected from 3 feet bgs at this location exceeded the RG for PAHs, but it is not included within an excavation area. EPA requested excavation of this area at the meeting where the tiered approach was discussed. Please ensure this location is excavated.	The area where Sample number 290109W6D was collected was excavated as part of the Remedial Action. This was verified with the excavation contractor. The figure will be updated to reflect excavation in this area.

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Comments from:

Amy Brownell – San Francisco Department of Public Health, June 3, 2014

Comment Number	Section/ Page	Comment	Response
<b>General Comments:</b>			
1.		As presented in Appendix G of the Final Work Plan Parcel C Remedial Action, it is important to state in Section 1.1 and Section 3.0 that the “tiered action levels” approach was developed based on the screening level HHRA conducted to provide appropriate risk management and verify the acceptability of leaving soil containing ubiquitous metals and organics with isolated concentrations above remedial goals (RGs) in place and beneath a durable cover in some areas. Thus, rather than excavate all soils above RGs, excavation will focus on removing higher concentrations of COCs that pose a more substantial risk to human health. For example, discussion of the HHRA in Section 1 focuses on removal of high concentrations of select COCs (rather than focusing on leaving soil in place with COCs above RGs), which veils/distracts from the purpose of this ESD.	Additional technical justification was added to Section 3.0. Please also see the response to WQCB comment 6
2.		Furthermore, the document could benefit from a more clear description of when Tier 1 vs. Tier 2 levels will be utilized to drive soil removal vs. soil left in place but below a cover. While we understand that the HHRA conducted under separate cover may have described this process in great detail, a brief presentation of the process would help the reader understand why a Tier 1 level was applied in one location and a Tier 2 level was applied in another. Specific sections that could benefit from this enhanced description are 1.2, 3.0, 4.1, 4.2 and 4.3. Additionally, the attached figures should depict the original excavation boundary and the revised excavation boundary utilizing the tiered approach.	Additional text was added to Section 3.0, 4.1.1, and 4.2. Please also see the responses to WQCB comments 3, 6, and 11 and USEPA general comment 3.  The figures display the ROD planned excavation areas with a dashed black line and the revised excavation areas with a solid red line.
<b>Specific Comments:</b>			
1.	<b>Section 2.0, Summary of Site History, Contamination and Selected Remedy, last sentence</b>	Suggest rewording to state: This ESD presents revised excavation boundaries using a tiered approach based on a screening level HHRA. High concentrations of COCs will still be removed, durable cover will be placed over remaining residual chemicals and ICs implemented.	The last sentence of Section 2.0 was revised as shown in WQCB comment 2.
2.	<b>Section 2.2.1, Site Risks for Soil, page 2-1</b>	Suggest switching order of 2nd and 3rd sentences; deleting “Most of” from 3rd sentence and inserting “Naturally occurring and” at beginning of 2nd sentence.	The sentences have been revised as recommended.

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3.	<b>Section 2. 2.1, Site Risks for Soil, page 2-2, 1st full paragraph</b>	Suggest deleting third sentence as the exclusion of essential nutrients from the risk assessment is also stated in the fifth sentence of this paragraph.	The paragraph has been revised as recommended.
4.	<b>Section 2.2.1, Site Risks for Soil, page 2-2, 2nd full paragraph</b>	Redevelopment blocks are referred to in the text but are not shown on a figure. Consider including a figure showing land use and redevelopment blocks used in baseline HHRA.	The redevelopment blocks were added to Figure 2-2. Please also see the response to DTSC Comment 1.
5.	<b>Section 2.4, Summary of Selected Remedy, 3rd paragraph</b>	Revise Alternative-5 to "Alternative S-5".	The text has been revised as recommended.
6.	<b>Section 2.4.1, Summary of Selected Soil Alternative S-5, page 2-3, last full sentence</b>	Suggest deleting "selected".	The text has been revised as recommended.
7.	<b>Section 4.2, Changes to Soil Excavation Boundaries, 2nd paragraph</b>	Should "replacement" be changed to "confirmation"?	The text has been revised as recommended.
8.	<b>Section 4.2, Changes to Soil Excavation Boundaries</b>	Please clarify whether excavations will be advanced to a maximum of ten feet beneath ground surface or to the depth that confirmation sample concentrations are below Tier 1 and Tier 2 action levels.	The text of Section 4.0 was revised to show the different excavation approaches. It now states, "The following excavation areas have non-significant changes where excavation depth was revised to extend 1 foot vertically from the known extent of contamination rather than 10 feet bgs as described in the Final ROD."

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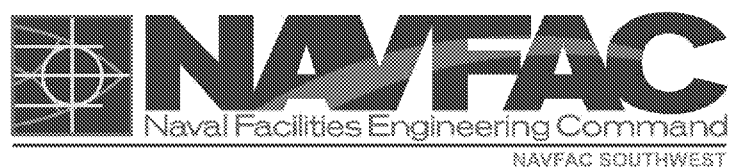
Comment Number	Section/ Page	Comment	Response
9.	<b>Section 4.3.2, Evaluation of Remedy Change for Parcel C, Performance, page 4-7</b>	Suggest revising section for clarity, as follows: Reduction of excavation volumes was based on use of Tier 1 and Tier 2 action levels. The screening level HHRA was performed to confirm that the risks and hazards associated with exposure to concentrations lower than the Tier 1 and Tier 2 action levels fall within the acceptable risk management range. In addition, the cover serves to break the exposure pathway for COCs left in place. Therefore, the performance of the remedy in regards to protectiveness of human health and the environment is not affected.	Text was added to this section stating: “Based on this evaluation, the Navy considers these changes to be significant. Application of tiered action levels for the excavation portion of the selected soil remedy will result in changes to the specific numerical RGs identified in the ROD. The tiered approach results in scope reduction and cost minimization but does not fundamentally alter the RAOs or the overall cleanup approach of excavation and protective cover. The protective cover ensures the contaminant pathway is broken and the tiered approach does not result in an unacceptable risk.”  Please also see the response to DTSC comment 5.
10.	<b>Section 7.0, Public Participation</b>	Should you replace Keith Forman’s contact information with Melanie Kito’s?	The contact information has been changed to Melanie Kito.
11.	<b>Figure 4-2, Revised Excavation Areas</b>	Please show excavations no longer proposed for removal in a different color from revised excavation boundaries.	Figure 4-2 was revised to remove excavation areas that are no longer proposed for removal (22-2 and 24-3) and to only show those excavation areas with revised boundaries.
12.	<b>Table 4-1, Action Levels</b>	Please verify the ROD RG for Aroclor-1260. The ROD RG for Aroclor-1260 is listed as 2.1 mg/kg and 1.05 mg/kg in Table 4-1 of the Draft ESD, while the ROD lists the residential RG as 0.21 mg/kg.	Table 4-1 has been revised.
13.	<b>Table 4-1, Action Levels</b>	Please list source of TPH RG.	The total petroleum hydrocarbons (TPH) RG was determined in the ROD.
<b>Minor Comments</b>			
1.	<b>Figure 2-2, Parcel C Location</b>	Should blue dashed line for “Groundwater Plume Area” be removed from Legend?	Thank you for your comment. We believe that showing the groundwater areas is beneficial to the overall figure.
2.	<b>Section 2.1, Site Description and History, next to last sentence</b>	Suggest deleting “and” following “institutional uses.”	The text has been revised as recommended.
3.	<b>Section 2.2.1, Site Risks for Soil, page 2-2, 1st full paragraph, 1st sentence</b>	Adjust font size.	The text has been revised as recommended.

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Comment Number	Section/ Page	Comment	Response
4.	<b>Table 4-1, Action Levels</b>	Mercury Action Level needs “a” footnote reference. Also the page numbering on this Table is incorrect.	The table has been revised as recommended.
5.	<b>Section 4 Figures:</b>	<p>These figures contain a number of acronyms, references and notes that are not always relevant to the information displayed and would be easier to understand if unnecessary information is removed. Following are some examples:</p> <ul style="list-style-type: none"> <li>• “ROD” on Figure 4-2;</li> <li>• Figure 4-3, shade previous excavation area boundary in legend green.</li> <li>• PRC 1994 excavation boundaries on Figure 4-4 and 4-5.</li> <li>• Note 2 Figures 4-3 through 4-11 can delete “not available in NIRIS database but was” and NIRIS acronym.</li> <li>• Add Mercury or Hg to Tier 1 action level notation under Tier 1 Action Level inset on Figures 4-4 through 4-11.</li> <li>• SS/SD, UST and other acronyms often defined but not used.</li> <li>• A note in legend could indicate all concentrations and action levels are in milligrams per kilogram to eliminate a substantial amount of text.</li> <li>• Figure 4-1 does not depict COS-1 and COS-3, which are both referenced in the Text in Section 2.2.1.</li> </ul>	<p>The figures were revised as recommended with the following exceptions. These aspects were not changed on the figures:</p> <ol style="list-style-type: none"> <li>1. The fourth bullet regarding “not available in NIRIS...”. This note was kept as is.</li> <li>2. The sixth bullet regarding SS/SD, UST and other acronyms. These acronyms were left in for consistency across figures.</li> <li>3. The seventh bullet regarding adding a note to the legend. The units were left adjacent to each action level.</li> <li>4. The eight and last bullet – COS-1 and COS-3 refer to redevelopment blocks in the text rather than excavation areas.</li> </ol>



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